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ABSTRACT

This curriculum guide contains operational guidelines to help local administrators, teacher educators, and industrial arts teachers in the State of Louisiana determine the extent to which their woodworking programs are meeting the needs of the youth they serve. It consists of a discussion of course prerequisites, goals, content, and implementation as well as 15 units devoted to various subject areas addressed in a woodworking program. Covered in the individual units are the wood laboratory; materials; hand tool care; woodjoinery; selection and planning of projects; estimation and selection of materials and supplies; material processing; fasteners; preparation for finishing; hardware; finishing technology; mass production; power tools; and occupational information. Each unit contains a statement of purpose, goals, topics and time allotments, student activities, teacher activities, and resources. Among those items provided in the guide's appendixes are lists of equipment, information sheets, tool safety information, and a selected bibliography. (MN)

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STATE OF LOUISIANA

DEPARTMENT OF EDUCATION

BULLETIN NO. 1684

INDUSTRIAL ARTS CURRICULUM GUIDE
in
BASIC WOODWORKING

Issued by

Office of Vocational Education

N. J. Stafford, Jr., Ed.D.
Assistant Superintendent

J. KELLY NIX
State Superintendent

CE 034 373

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FOREWORD

This publication is a guide for the improvement of instruction in Industrial Arts Education for the State of Louisiana. It should be of benefit to industrial arts teachers, supervisors, counselors, and administrators. These operational guidelines will help local administrators, teacher educators, and industrial arts teachers to determine the extent to which their programs are meeting the needs of our youth. Industrial Arts Education Programs must be organized to meet the needs of all students.

A constant concern for educators is the construction and revision of curriculum. Industry and technology are the core of industrial arts instruction. Both are constantly changing; therefore, curriculum and instruction must change in order to provide students a realistic and accurate understanding of industry and its function in our complex technological society.

J. Kelly Nix

J. KELLY NIX
State Superintendent of Education

ACKNOWLEDGEMENTS

This publication represents the cooperative efforts of personnel in the Louisiana Industrial Arts Association and the Industrial Arts Section in the Office of Vocational Education, Louisiana State Department of Education. Special recognition goes to Dr. Thomas Eppler, Northwestern State University, Regional Co-Director; Dr. Vincent F. Kuetemeyer, Louisiana State University, Regional Co-Director; Mr. Thomas Landry, University of Southwestern Louisiana, Regional Co-Director; and Dr. James W. Trott, Louisiana State University, Project Coordinator-Director who served as Project Director in the development of the guide. Special commendation goes also to members of the writing team who worked diligently to make this publication a reality.

The following teachers spent many hours writing, field testing, and finalizing these guidelines. They are: Nathaniel C. Johnson, Raphael N. Songy, Samuel O. Spears, Michael Beauvais, John M. Lee, James W. Parker, and H. Carl Schaff.

N. J. Stafford

N. J. Stafford, Jr., Ed.D.
Assistant Superintendent
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INTRODUCTION

Basic Woodworking Instructional materials were developed with the following considerations:

A. General Industrial Arts is a prerequisite for this course.

B. Primary emphasis is placed on hand tool experiences.

C. Safety will be taught, tested, and required throughout.

D. The teacher will have the option of teaching basic machine processes in the latter part of the course.

E. Mass Production should be taught,and implementation of a production line for a mass production product is highly recommended.

F. The units are sequenced. The instructor may revise sequences or cover different parts of a unit.

G. Course length is based on 36 weeks (180 contact hours).

H. Course credit is one (1) unit (1/2 unit for mid-year graduates).

I. The overall goal of basic woodworking is that the student have a firm foundation in basic hand tool skills and be prepared to advance to the next level in machine tool skills.

COURSE DESCRIPTION

Basic woodworking is designed as a course in hand tools. While flexibility in teaching basic machine tools is allowed, the intention of this course is to offer the student an introduction to the power tools only after developing sufficient skills in hand tool processes.

The unit on safety should be actively used in all areas of instruction. Safety tests should be given and kept on file because they would possibly defend the teacher in litigation. The tests should include questions on all major specific safety rules, and the student should not be allowed use of a tool until he scores 100 % on the tests. The safety tests could include a section for the parent's signature giving the student permission to use the tool(s).

Mass Production should be taught after the students have developed basic skills, and can be used on either a money-making product or can be given to the students as a finished product. The type of product to be mass produced would depend on tools to be used, space, costs, etc. for each course. Projects brought home by the students offer excellent public relations for the course, instructor, school, and community.

Basic Woodworking is designed for grades 10 through 12.

Prerequisite: General Industrial Arts Course.

COURSE GOALS

Students will be introduced to the Industrial Arts Wood Laboratory, its layout, management, evaluation, and safety procedures.

Students will become consumer-oriented toward lumber and lumber products.

Students will be able to identify, select, and develop skills in the use and care of basic hand tools.

Students should be able to identify, select, and construct basic woodworking joints.

Students will learn the selection process, principles of design, and basic drawing techniques involved in product planning.

The student will be able to select and estimate materials needed for products.

The student will be able to process stock in a reasonable manner by squaring, gluing, bending, veneering, and edging.

The student will be able to select and use the proper fasteners for a product.

The student will be able to prepare for finishing by preventive and corrective means during and after construction.

The student will be able to identify, select, and install appropriate hardware for wood products.

The student will be able to identify, select, and use appropriate finishes and supplies.

The student will apply industrial production techniques to products designed for mass production.

The student will demonstrate the skills necessary for safe operation of portable power tools.

The student will demonstrate the skills necessary for safe operation of stationary power tools.

The student will compare occupations related to woodworking.

The student will display safety consciousness.

CONTENT OUTLINE

BASIC WOODWORKING (GRADES 10-12)

		Estimated minimum coverage time in weeks
UNIT I	ORIENTATION TO THE WOOD LABORATORY	1/2
UNIT II	INTRODUCTION TO MATERIALS	1
UNIT III	BASIC HAND TOOL CARE, SELECTION, AND USE	2
UNIT IV	WOOD JOINERY	1/2
UNIT V	SELECTION OF AND PLANNING PROJECTS	1
UNIT VI	ESTIMATING AND SELECTING MATERIALS AND SUPPLIES	1
UNIT VII	MATERIALS PROCESSING	5
UNIT VIII	FASTENERS	1
UNIT IX	PREPARATION FOR FINISHING	1
UNIT X	HARDWARE	1/2
UNIT XI	FINISHING TECHNOLOGY	1
UNIT XII	MASS PRODUCTION	1
UNIT XIII	PORTABLE POWER TOOLS	1
UNIT XIV	STATIONARY POWER TOOLS	1
UNIT XV	OCCUPATIONAL INFORMATION	1/2

BASIC WOODWORKING

I. Orientation to Basic Woods
  - A. General Overview of Course
    - 1. Course Description and Content
      - a. Goals
      - b. Objectives
      - c. Activities
      - d. Projects (Control/Individual/MP/GP)
    - 2. Student Personnel Organization
      - a. Job descriptions
      - b. Assignment charts/boards
      - c. Responsibilities
      - d. Chain of command

  - B. Grading Procedures
    - 1. Attitudes
      - a. Lab work
      - b. Study assignments
      - c. Cooperation
      - d. Attendance and punctuality
      - e. Behavior
    - 2. Testing
      - a. Quizzes
      - b. Semester
    - 3. Project Evaluation
      - a. Student
      - b. Instructor
      - c. Follow-up

  - C. Tour of Wood Lab and Facilities
    - 1. Identification and Location of Tools and Equipment
      - a. Hand tool storage
      - b. Machine tool location and identification
      - c. Location miscellaneous equipment
    - 2. Wood Lab Safety
      - a. Safety rules for lab
        - (1) Fire exits and drills
        - (2) Storage areas
        - (3) Supplies
        - (4) Overhead extension cords
      - b. Safety equipment locations
        - (1) Eye protection
        - (2) First aid
        - (3) Fire extinguishers
        - (4) Power panel and master switch
        - (5) Push sticks and devices
        - (6) Metal containers for oily rags

- (7) Metal Cabinet for finishing materials
- (8) Safety Metal containers for flammable liquids

II. Introduction to Materials

- A. Tree Growth and Development
  - 1. Hardwoods
    - a. Identifying
    - b. Characteristics
    - c. Uses
    - d. Open grain/closed grain
  - 2. Softwoods
    - a. Identifying
    - b. Characteristics
    - c. Uses
    - d. Open grain/closed grain
- B. Lumbering Operations
  - 1. Forestry
  - 2. Logging Industry
  - 3. Cutting Logs into Lumber
    - a. Plain (flat) Sawed Lumber
      - (1) Characteristics
      - (2) Advantage/Disadvantage
    - b. Quarter Sawed Lumber
      - (1) Characteristics
      - (2) Advantage/Disadvantage
  - 4. Seasoning Methods
    - a. Air Dried(AD)
      - (1) Characteristics
      - (2) Advantage/Disadvantage
    - b. Kiln Dried (KD)
      - (1) Characteristics
      - (2) Advantage/Disadvantage
    - c. Combination
      - (1) Advantage
      - (2) Disadvantage
  - 5. Grading of Lumber
    - a. Grading of softwoods
    - b. Grading of hardwoods
    - c. Defects that affect grading
  - 6. Selection of and Grading Lumber Products
    - a. Plywood
      - (1) Veneer core
      - (2) Lumber core
      - (3) Solid core (Particle Center)
      - (4) Interior/Exterior
      - (5) Hardwood plywood grades
      - (6) Softwood plywood grades
      - (7) Marine plywood
      - (8) Fibercore

- b. Hardboard
  - (1) Service Grade
  - (2) Untempered
  - (3) Tempered
- c. Particle board
  - (1) Uses
  - (2) Advantage
  - (3) Disadvantage

III. Basic Hand Tool Care, Selection and Use

- A. Hand Tool Safety
- B. Layout and Measuring Tools
  - 1. Reading A Rule (To 16th of an inch)
    - a. Add fractions
    - b. Divide fractions
    - c. Multiply fractions
    - d. Subtract fractions
    - e. Division into equal parts
  - 2. Measuring Tapes
  - 3. Bench Rules
  - 4. Framing Square
  - 5. Try Square
  - 6. Combination Square
  - 7. T-Bevel
  - 8. Dividers
  - 9. Trammel Points
  - 10. Marking Gage
  - 11. Pencil
  - 12. Awl
- C. Sawing Tools
  - 1. Hand Saws
    - a. Rip
    - b. Crosscut
  - 2. Back Saws
    - a. Dovetail
    - b. Miter
  - 3. Coping Saws
  - 4. Compass/Keyhole Saws
  - 5. Hack Saw
- D. Holding Tools
  - 1. Clamps
    - a. "C"
    - b. Bar
    - c. Band
    - d. Hand screw
  - 2. Pliers
  - 3. Vises
  - 4. Stops
  - 5. Bench Hook

- E. Boring Tools
  - 1. Brace
  - 2. Hand Drill
  - 3. Auger Bits
  - 4. Twist Drill
  - 5. Expansive Bit
  - 6. Foerstner Bit
  - 7. Screw Bit
  - 8. Counter Sink Bit
- F. Driving Tools
  - 1. Claw Hammers
  - 2. Mallets
  - 3. Nail Sets
  - 4. Screwdrivers
    - a. Standard
    - b. Phillips
    - c. Offset
    - d. Bits standard/phillips
  - 5. Wrenches
  - 6. Stapler
- G. Shaping Tools
  - 1. Planes
    - a. Block
    - b. Smoothing
    - c. Jack
  - 2. Chisels
    - a. Socket
    - b. Socket Firmer
    - c. Tang
    - d. Carving
  - 3. Knives
    - a. Sloyd
    - b. Utility
    - c. Modeling (X-Acto)
  - 4. Spokeshaves
  - 5. Draw Knives
  - 6. Rasps
  - 7. Wood Files
  - 8. Surform Tools

IV. Wood Joinery

- A. Common Joints
  - 1. Butt
    - a. Edge-Edge
    - b. End-End
    - c. Face-Face
    - d. Edge-End
    - e. Edge-Face
    - f. End-Face

        - 2. Rabbet
        - 3. Dado/Groove
            - a. Through dado
            - b. Blind dado
        - 4. Miter
        - 5. Lap
            - a. End
            - b. Middle
            - c. Corner
            - d. Crosslap
        - 6. Mortise and Tenon
            - a. Open
            - b. Blind
            - c. Keyed
        - 7. Dovetail (simple)
    - B. Selection and Considerations
    - C. Trial Assemblies
    - D. Assembling
        - 1. Preparation of Materials
        - 2. Sub-Assemblies

V. Selection of and Planning Projects

- A. Determining Needs
    - 1. Usefulness
    - 2. Desirability
    - 3. Versatility
- B. Design Factors
    - 1. Function
        - a. Strength
        - b. Capacity
        - c. Overall size
    - 2. Appearance
        - a. Utility/Style
        - b. Color
        - c. Harmony
        - d. Balance
        - e. Aesthetic qualities
- C. Periods
    - 1. Periods/locale/craftsmen
    - 2. Examples of Periods
        - a. Duncan Phyfe
        - b. Chippendale
        - c. Louis XIV
        - d. Queen Anne
        - e. Victorian
        - f. Sheridan
        - g. Hepplewhite
        - h. Adams Brothers

E. Alphabet of Lines
    1. Border
    2. Center
    3. Object
    4. Hidden
    5. Extension
    6. Dimension
F. Making and Reading Drawings
    1. Sketching
    2. Pictorials
        a. Oblique
        b. Isometric
        c. Perspective
    3. Orthographic Projection
        a. Relationships of Views
        b. Selection of appropriate views
        c. Use of graph paper
            (1) Sketching to determine proportion and sizes
            (2) Sketching to determine necessary views
            (3) Sketching to determine necessary details
        d. Working Drawings
            (1) Complete size information
            (2) Complete shape information
            (3) Auxiliary views and/or details
G. Bill of Materials (Basic)
    1. Form for bill of materials
    2. Data to be prepared
        a. Type of lumber/plywood
        b. How many/how much
        c. Dimensions
        d. Parts identification
H. Plan of Procedure
    1. Steps of Construction
    2. Tool Use List
        a. Separate list keyed to steps
        b. At appropriate steps

VI. Estimating and Selecting Materials and Supplies
A. Materials
    1. Wood
        a. Selection of Wood
            (1) Samples of Common hardwood and softwood
            (2) Open grain vs closed grain
            (3) Color and Graining
            (4) Selecting grades
            (5) Selecting seasoning method
            (6) Selecting for strength and durability/use

- VII. Material Processing
  - A. Squaring Stock to Finished Dimensions
    - 1. Stock Cutting Sizes (allowance for trimming)
    - 2. Procedure for Squaring Boards
      - a. Selection of best face
        - (1) Sap side vs heart side
        - (2) Advantages/ disadvantages
      - b. Parts and dimensions of a board
      - c. Steps in squaring to size
  - B. Gluing and Clamping
    - 1. Common Wood Glues
      - a. Pre-mixed
        - (1) White glue
        - (2) Contact cement
        - (3) Liquid hide
      - b. Powdered glues
        - (1) Plastic resin
        - (2) Casein
        - (3) Animal (Hide)
      - c. Miscellaneous glues
        - (1) Resorcinal (Boat)
        - (2) Epoxy
        - (3) Model cement
    - 2. Purpose of Gluing Wood
      - a. To increase size of boards
      - b. To join parts
      - c. To laminate
    - 3. Laminating
      - a. Definition
      - b. Uses
        - (1) Beauty
        - (2) Strength
        - (3) Stability
        - (4) Forming
  - C. Bending
    - 1. Uses
    - 2. Methods
      - a. Steam
      - b. Kerfing
      - c. Combination
      - d. Green Lumber
  - D. Veneers
    - 1. Definition
    - 2. Uses
      - a. Plywood (Panels and Molded)
      - b. Overlay
      - c. Inlay
      - d. Marquetry

        - (7) Selecting for stability
        - (8) Selecting for working qualities
    - b. Estimating Wood
        - (1) Definition of a Board Foot (BF)
        - (2) Calculating BF
        - (3) Calculating Waste Allowance
        - (4) Calculating Cost
- 2. Plywood
    - a. Softwood/hardwood plywood
        - (1) Characteristics
        - (2) Uses
        - (3) Standard sizes
        - (4) Selection of grade
        - (5) Selection of type
    - b. Estimating sheet materials
        - (1) Definitions of square foot (SF)
        - (2) Calculating SF
        - (3) Planning quantity needed, based on standard sizes available
        - (4) Planning for waste allowance
        - (5) Calculating cost
- 3. Hard Board
    - a. Uses and applications
    - b. Selection of proper grade
    - c. Standard sizes available
- 4. Particle Board
    - a. Uses and applications
    - b. Selection of proper grade
    - c. Standard sizes available

B. Supplies and Hardware

- 1. Estimating Liquid Coverage
    - a. Finishing materials
    - b. Glues and adhesives
    - c. Quantity needed and cost
- 2. Estimating Hardware
    - a. Standard types and sizes
    - b. Styles
    - c. Costs

C. Bill of Materials (complete)

- 1. Parts identification
- 2. Number of pieces
- 3. Thickness, width, length (inches)
- 4. Type of materials
- 5. Number of BF/SF
- 6. Costs
    - a. Individual
    - b. Total

- e. Laminating
- f. Bending
- e. Edging
    - (1) Decorative
        - (a) Chamfer
        - (b) Bevel
        - (c) Molded
    - (2) Concealing (Plywood and Particle Board)
        - (a) Banding (Veneer)
        - (b) Molding
        - (c) Solid Stock (Plain)
        - (d) Solid Stock (Molded)

VIII. Fasteners

- A. Nails
    - 1. Standard Types
        - a. Common
        - b. Finishing
        - c. Casing
        - d. Box
        - e. Brads
        - f. Selection
    - 2. Standard Sizes
        - a. Lengths - 1" (2d) - 6" (60d)
        - b. Selection
- B. Screws
    - 1. Standard Types
        - a. Flat head
        - b. Round head
        - c. Oval head
    - 2. Standard Lengths
        - a. 3/16 - 6"
        - b. Selection
    - 3. Standard Number (Gage)
        - a. #0 - #24
        - b. Selection
    - 4. Counter-Sinking
    - 5. Counter-Boring
        - a. Purpose
        - b. Flush plugs
        - c. Button plugs
    - 6. Clearance Holes for Screws
        - a. Shank hole
        - b. Pilot hole
        - c. Starter hole

C. Miscellaneous Fasteners
  1. Bolts and Nuts
  2. Dowels
  3. Flush plates
  4. Screw Anchors
  5. Staples
  6. Corrugated Fasteners
  7. Pinch Dogs
  8. Special Adhesives

IX. Preparation for Finishing
A. Surface Glue Elimination
  1. Applying correct amount of glue
  2. Removal procedures
    a. Wiping excess with wet cloth before drying
    b. Scraping surface
    c. Sanding
B. Surface Preparation
  1. Planing to smooth mill marks
  2. Scraping (curly grained woods)
  3. Sanding
    a. Beginning with coarsest grade necessary
    b. Progressing to finer grades
    c. Final sanding with grain
    d. Assuring all scratches and marks are removed
  4. Bleaching
    a. Purpose
    b. Procedure
  5. Grain Raising
    a. Purpose
    b. Procedure
  6. Distressing
    a. Purpose
    b. Procedure
  7. Wash Coat
    a. Purpose
    b. Procedure
  8. Patching and Repairing
    a. Steaming dents
    b. Cracks, defects and nail holes
      (1) Wood putty
      (2) Plastic wood
      (3) Wood plugs and patches
      (4) Glue and sawdust
      (5) Spackling

X. Hardware
- A. Surface Hardware
  - 1. Considerations
    - a. Style
    - b. Finish
    - c. Size
    - d. Type
  - 2. Kinds of Surface Hardware
    - a. Knobs, pulls, handles
    - b. Hinges
      - (1) Cabinet
      - (2) Butt
      - (3) Decorative
    - c. Metal corners
    - d. Locks
    - e. Hasps and staples
    - f. Surface trim
    - g. Lamp fittings
- B. Other Hardware
  - 1. Drawer roller hardware and guides
  - 2. Catches
    - a. Friction
    - b. Magnetic
    - c. Elbow
    - d. Bullet
  - 3. Lid Chains and Stop Bars
  - 4. Lazy Susan Bearings
  - 5. Metal Shelf Standards and Clips

XI. Finishing Technology
- A. Finishes
  - 1. Opaque
    - a. Definition
    - b. Purpose
    - c. Specific preparation and application
    - d. Types
      - (1) Paints
      - (2) Enamels
      - (3) Epoxies
      - (4) Lacquers (colored)
      - (5) Acrylics
  - 2. Transparent
    - a. Definition
    - b. Purpose
    - c. Specific preparation and application
    - d. Types
      - (1) Varnishes

        - (2) Lacquers
        - (3) Epoxies
        - (4) Shellac
        - (5) Sealers
- B. Solvants
    - 1. Definition
    - 2. Types and uses
        - a. Turpentine
        - b. Alcohol
        - c. Lacquer thinner
        - d. Paint thinners
        - e. Mineral spirits (Varsol, Kerosene, etc.)
        - f. Water
- C. Finishing Materials
    - 1. Uses and applications
    - 2. Types
        - a. Bleaches
        - b. Stains
            - (1) Oil
            - (2) Water
            - (3) Spirit
        - c. Sealers/Wash coats
        - d. Fillers
        - e. Linseed oil
        - f. Tung oil
        - g. Tintingbase
        - h. Oil colors
        - i. Powder stains and dyes
- D. Finishing Supplies
    - 1. Uses and applications
    - 2. Types
        - a. Brushes
        - b. Rotten stone
        - c. Pumice stone
        - d. Rubbing oil
        - e. Rubbing compound
        - f. Polishing compound
        - g. Steel wool
        - h. Wet/Dry abrasives
- E. Surface Coverings and Trim
    - 1. Plastic Laminates
    - 2. Flocking and/or Felt
    - 3. Decals and Appliques
    - 4. Vinyl, Contact Paper, Cloth
    - 5. Miscellaneous Moldings, Trim
- F. Finishing Safety
    - 1. Ventilation
    - 2. Storage
        - a. Oily rags
        - b. Finishing materials

XII. Mass Production

- A. Business and Finance
  - 1. Establish Company Ownership
    - a. Proprietorship/Partnership (Students/Teachers)
    - b. Corporation (if product is to be sold)
      - (1) Sell certificates and shares
      - (2) Profit sharing and losses
      - (3) Meetings of stockholders
      - (4) Legal requirements
      - (5) Dissolving the corporation
  - 2. Accounting
    - a. Capital available
    - b. Production costs
    - *c. Sales
    - *d. Profits/Losses
    - *e. Share distribution
- B. Market Research/Product Selection
  - 1. Determining Market for Products
    - a. Utility
    - b. Desirability
    - c. Availability
    - d. Cost analysis
  - 2. Product Selection
- C. Product Design and Engineering
  - 1. Sketching and Designing
  - 2. Product Simplification
  - 3. Standardization of Parts
  - 4. Working Drawing
  - 5. Pilot Model/Prototype Construction
    Construction analysis for M.P.
    - (1) Type of materials
    - (2) Operations
    - (3) Finishing methods
    - (4) Modifications
- D. Production Engineering
  - 1. Tooling Up
    - a. Machine and tool set up/modifications
    - b. Jigs
    - c. Fixtures
  - 2. Equipment Layout and Production Lines
    - a. Production line analysis
    - b. Organization of machines, materials and workers
    - c. Inspection points/quality control
    - d. Flow charts
- E. Storage/Packaging and Shipping
  - 1. Materials Storage
  - 2. Product Storage
  - 3. Packaging Methods
  - 4. Shipping Methods

XIII. Portable Power Tools (Woodworking)

- A. Safety
- B. Portable Power Tools (General Information)
  - 1. Size/H.P. Ratings
  - 2. Types Blades, Cutters, and Bits
  - 3. Basic Parts and Adjustments
  - 4. Changing Cutter, Bits, and Blades
- C. Portable Power Tools (Specific Information)
  - 1. Circular Saws
    - a. Capacity
    - b. Types of cuts
    - c. Use of guides
    - d. Free landing
  - *2. Drills
    - a. Types
    - b. Accessories
  - *3. Sanders
    - a. Types
    - b. Sanding techniques
    - c. Shaping and forming
  - *4. Saber Saw
    - a. Type blades/materials
    - b. Type
      - (1) Internal cuts
      - (2) External cuts
      - (3) Bevel cuts
    - c. Limitations
      - (1) Curves
      - (2) Stock thickness
  - 5. Router
    - a. Surface cuts
    - b. Edge and end cuts
  - 6. Portable Planer
  - 7. Miter Saw
  - 8. Buffers/Polishers

*Recommended for basic woods - others optional.

XIV Introduction to Stationary Power Tools (Woodwork)

- A. Safety
  - 1. Guards and Safety Equipment
  - 2. Safety Operator Zones
  - 3. Specific Safety Rules
- B. Stationary Power Tools (General Information)
  - 1. Size/HP ratings
  - 2. Basic Accessories
  - 3. Types of cutters, blades, bits
  - 4. Nomenclature
  - 5. Adjustments

C. Stationary Power Tools (Specific Information)
  1. Circular Saws
    a. Basic cuts
    b. Basic set-up for ripping/C.C.
  2. Thickness Planer
    a. Procedure for rough stock
      (1) Facing the board
      (2) Setting for maximum thickness
    b. Thickness of cut
    c. Cutting feed rate
    d. Planning to finished thickness
    e. Wavy grained stock
  3. Jointers and Uniplanes
    a. Procedure for warped stock
    b. Maximum thickness of cut
    c. Types of basic cuts
    d. Push paddles or sticks
  *4. Tool Grinders
    a. Grinding procedures
    b. Sharpening
    c. Coolants/lubricants
  *5. Drill Press
    a. Drilling and boring
    b. Mortising
  6. Band Saw
    a. Re-sawing
    b. Sawing curves
    c. Sawing straight cuts
    d. Sawing bevel cuts
    e. Multiple sawing
  *7. Scroll Saw
    a. Internal cuts
    b. External cuts
    c. Bevel cuts
    d. Multiple sawing

*Recommended for basic woods --others optional.

XV. Occupational Information

A. The Wood Industry
  1. Construction
    a. Housing
    b. Office buildings
    c. Bridges
    d. Schools
    e. Churches
  2. Manufacturing
    a. Furniture

        - b. Cabinets
        - c. Doors
        - d. Windows
    - 3. Service
        - a. Repairs
        - b. Engineering
        - c. Architects
    - 4. Transportation
        - a. Logs and mill
        - b. Lumber
        - c. Product
- B. Career Opportunities
    - 1. Considerations
        - a. Personality
        - b. Mental abilities
        - c. Physical abilities
        - d. Interests
        - e. Job requirements
- C. Job Classifications
    - 1. Unskilled
        - a. No required training
        - b. Physical
        - c. Material moving/handling
    - 2. Semi-skilled
        - a. Some special training
        - b. O.J.T.
        - c. Machine operators
    - 3. Skilled
        - a. Craftsman/Tradesman
        - b. Performs all tasks of the trade
        - c. Journeymen
            - (1) Apprenticeship
            - (2) Classroom instruction
        - d. Skilled crafts
            - (1) Carpentry
            - (2) Cabinetmaking
            - (3) Pattern making
    - 4. Semiprofessional
        - a. Forester
        - b. Engineer
        - c. Architect
        - d. Furniture designers
        - e. Real estate broker
        - f. Banker
        - g. Management
        - h. Teachers

UNIT TITLE I ORIENTATION TO THE WOOD LABORATORY

INTRODUCTION (PURPOSE/ RATIONALE/ INTENTION)	UNIT GOAL(S)	GENERAL UNIT OBJECTIVES
The purpose of this unit is to introduce the student to the basic woodworking course. Students will be briefed on grading procedures course content, activities, tools/equipment, and general safety rules.	To introduce students to the Industrial Arts Wood Labaratory-its layout, management, evaluation, and safety procedures.	Upon completion of this unit, students should be able to: 1. Understand the broad scope of course content and activities. 2. Understand the grading procedures. 3. Identify locations of tools and equipment. 4. Observe and comply with general safety rules.

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
At the conclusion of this unit, the student should be able to: Display awareness of course offering and activities.	A. General Overview of Course 1. Course Description and Content a. Goals b. Objectives c. Activities	Note taking Discuss expectations, realities, and common points of agreement with teacher.	Present material Act as moderator for student discussions.	State Guides Resource Person and/or materials
Develop responsible behavioral attitudes required in industry and adequately displayed in classroom management.	2. Student Personnel Organization a. Job assignments for laboratory b. Assignment charts/boards c. Responsibilities d. Chain of command	Discuss past experiences related to woodworking. Make job assignment chart or job assignment board.		
Interpret the value of all activities used in establishing grades.	B. Grading Procedures 1. Attitude a. Lab work b. Study assignments c. Cooperation d. Attendance/Punctuality e. Behavior 2. Testing a. Quizzes b. Tests c. Semester exams 3. Project Evaluation a. Student b. Instructor c. Follow-Up	Copy grading procedure in notebooks. Have discussion, question/answer period.	Write grading procedure on board and explain with examples on board how the procedure works. Moderate discussion.	Selected Visual Aids: (Report cards, charts)
Identify and locate tools and equipment found in the woods laboratory.	C. Tour of Wood Lab and Facilities 1. Identification and location of tools and equipment a. Hand tool storage b. Machine tool locations c. Location of miscellaneous equipment	Observe locations of equipment and supplies.	Conduct tour of wood lab equipment and supplies.	

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
Successfully pass a general safety test concerning the wood lab, its equipment, supplies, and operational procedures.	2. Wood Lab Safety a. Safety rules (review general safety) (1) Fire exits and drills (2) Storage areas (3) Supplies (4) Overhead Extension Cords b. Safety equipment location (1) Eye protection (2) First aid (3) Fire extinguishers (4) Power panel and master switch (5) Push sticks and devices (6) Metal containers (oily rags) (7) Metal cabinet (finish materials) (8) Safety containers for flammable liquids	Review general safety rules.	Present general safety rules of class and lab. Discuss specific lab safety rules.	(10) P. 28 See Appendix See General Industrial Arts Curriculum Guide.

UNIT TITLE II INTRODUCTION TO MATERIALS

INTRODUCTION (PURPOSE/ RATIONALE/ INTENTION)	UNIT GOAL(S)	GENERAL UNIT OBJECTIVES
This unit will enumerate the choices of materials available for woodworking projects and design.	Students will become consumer oriented toward lumber and lumber products.	The student will: Identify and display a working knowledge of available lumber products.

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
At the conclusion of this unit, the student should be able to: Distinguish between hardwoods and softwoods. Display a working knowledge of the characteristics and uses of various lumbers.	A. Trace Growth and Development Hardwoods/Softwoods a. Identifying b. Characteristics c. Uses d. Open grained/closed grained	Observe displays. Take notes in notebooks. Participation in class discussions. Take sample woods identification test.	Display samples of lumber, exhibiting various characteristics and qualities of each. Identify and discuss lumbering operations, and tree growth and development.	Local lumber yard Selected tests
	B. Lumbering Operations 1. Forestry 2. Logging Industry 3. Cutting Logs into Lumber: Characteristics, Advantages, and Disadvantages of: a. Plain (flat) sawed lumber b. Quarter sawed lumber 4. Seasoning Methods: Characteristics, Advantages, and Disadvantages of: a. Air dried (AD) b. Kiln dried (KD) c. Combination (AD/KD) 5. Grading of Lumber a. Grading of softwoods b. Grading of hardwoods c. Defects that affect grading			
	6. Selection of and Grading Lumber Products a. Plywood (1) Veneer core (2) Lumber core (3) Solid Core (particle center) (4) Interior/exterior (5) Hardwood plywood grades	Study assigned pages in textbook. Take test on unit. Review test.	Make and administer study assignments from textbooks on materials.	Textbook Lumber and plywood samples.

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	(6) Softwood plywood grades (7) Marine Plywood b. Hard board (1) Service (2) Untempered (3) Tempered c. Particle board (1) Uses (2) Advantages (3) Disadvantages			

UNIT TITLE III BASIC HAND TOOL CARE, SELECTION, AND USE

INTRODUCTION (PURPOSE/ RATIONALE/ INTENTION)	UNIT GOAL(S)	GENERAL UNIT OBJECTIVES
The purpose of this unit is to provide the student with a working knowledge of the care, selection, and use of hand tools in woodworking. Special emphasis should be placed on measuring and computation of fractions.	Students will be able to identify, select, and develop skills in the use and care of basic hand tools.	At the conclusion of this unit, the student should be able to: Compute fractions and use the ruler accurately. Properly use woodworking hand tools.

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
At the conclusion of this unit, students should be able to:	A. Hand Tool Safety B. Layout and Measuring Tools 1. Reading a Rule (to 16ths) a. Fractions	Copy presentation in notes.	Present an enlarged scale view of a standard rule, with divisions to 16ths of an inch.	Safety: Appendix
Read and use a ruler.	(1) Addition (2) Division (3) Multiplication	Compute various fractions by addition, subtraction, division, and multiplication.		
Compute fractions.	(4) Subtraction b. Division into equal parts		Discuss relationships of fractions.	
Properly use layout, sawing, holding, boring, driving, and shaping tools.	2. Measuring Tapes 3. Bench Rule 4. Framing Square 5. Try Square	Divide a board into a given number of parts using a rule.	Demonstrate the use of a rule to divide into equal parts.	Laying out and measuring with common fractions.
	6. Combination Square 7. T-Bevel Square	Observe and practice the correct procedures of using tools.		Charts
	8. Dividers 9. Trammel Points 10. Marking Gage 11. Pencil 12. Awl C. Sawing Tools 1. Hand Saws a. Rip b. Crosscut 2. Back Saws a. Dovetail b. Miter 3. Coping Saw 4. Compass/Keyhole Saw 5. Hack Saw D. Holding Tools 1. Clamps a. "C" b. Bar c. Band d. Handscrew		Define, identify, and demonstrate the safe use of tools.	

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	2. Pliers	Study, observe, and practice the definitions, identities and safe use of holding, boring, driving, and shaping tools.	Define, identify, and demonstrate the safe use of holding, boring, driving, and shaping tools.	Selected tests.
	3. Vises			
	4. Stops			
	5. Bench Hook			
	E. Boring Tools			
	1. Brace			
	2. Hand Drill			
	3. Auger Bits			
	4. Twist Drill			
	5. Expansive Bit			
	6. Foerstner Bit			
	7. Screw Mate Bit			
	8. Countersink Bit			
	F. Driving Tools			
	1. Claw Hammer			
	2. Mallets			
	3. Nail Sets			
	4. Screwdrivers			
	a. Standard			
	b. Phillips			
	c. Offset			
	d. Bits (Standard/Phillips)			
	e. Wrenches			
	f. Stapler			
	G. Shaping Tools			
	1. Planes			
	a. Block			
	b. Jack			
	c. Smooth			
	2. Chisels			
	a. Socket			
	b. Firmer			Textbook
	c. Tang			
	d. Carving			
	3. Knives			
	a. Sloyd			
	b. Utility			
	c. Molding (X-Acto)			
	4. Spokeshaves			
	5. Drawknives			
	6. Rasps			
	7. Wood Files			
	8. Surform tools			

.UNIT TITLE IV WOOD JOINERY

INTRODUCTION (PURPOSE/ RATIONALE/ INTENTION)	UNIT GOAL(S)	GENERAL UNIT OBJECTIVES
This unit will provide information on the selection and construction of joinery methods commonly used in basic woodworking.	Students should be able to identify, select, and construct basic woodworking joints.	At the conclusion of this unit the students should be able to: Determine the best joinery and assembly methods to use for certain types of projects.

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
At the conclusion of this unit the student will be able to:	A. Common Joints 1. Butt a. Edge-Edge b. End-End c. Face-Face d. Edge-Face e. Edge-End f. End-Face	Observe and discuss purposes, advantages, and disadvantages of the common joints used in woodworking.	Demonstrate and discuss the common joints used in woodworking.	Text, samples, and furniture
Identify, select, and construct basic wood joints.		Observe demonstration and then practice the construction of joints on lumber provided.	Demonstrate procedures to be used for laying out and constructing the common wood joints.	Stanley Tool Guide-Form No. 75-10/72
Organize and plan assembly processes.	2. Rabbet 3. Dado/Groove a. Through b. Blind		Provide lumber to students for practice work. Supervise student activities.	
Define the term "Tolerance."	4. Miter 5. Lap a. End b. Middle c. Corner d. Cross		Illustrate the importance of a properly fitted joint and allowable tolerances.	
	6. Mortise and Tenon a. Open b. Blind c. Keyed		Demonstrate the relative strengths and weaknesses of each. Explain importance of trial assemblies.	
	7. Dovetail (simple) B. Selection Considerations C. Trial Assemblies D. Assembling a. Preparations b. Sub-Assemblies		Demonstrate the use of sub-assemblies.	

UNIT TITLE V SELECTION OF AND PLANNING PROJECTS

INTRODUCTION (PURPOSE/ RATIONALE/ INTENTION)	UNIT GOAL(S)	GENERAL UNIT OBJECTIVES
This unit is designed to develop students' skills in selecting, designing, and planning of a working drawing. Added emphasis should be placed on sketching and selecting the appropriate views.	Students will learn the selection process, design principles, and basic drawing techniques involved in product planning.	At the conclusion of this unit the student should be able to: Plan and complete a working drawing, a basic bill of materials, and a plan of procedure.

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
At the conclusion of this unit, the student should be able to: Choose a product for construction based on needs, styling/period, & incorporation of good design features.	A. Determining Needs 1. Usefulness 2. Desirability 3. Versatility B. Design Factors 1. Function 2. Appearance C. Styles 1. Surface Features 2. Examples a. Early American b. French Provincial c. Others D. Periods 1. Periods/Locale/ Craftsman 2. Examples a. Duncan Phyfe b. Chippendale	Assess individual needs, discuss possible project ideas (individual, group, or mass production) Make notes of ideas in notebooks, along with references.	Lead discussion of factors involved in determining needs, design/styles/periods.	Magazines, catalogs, media, texts, etc.
Develop product plans using the proper techniques of drawing.	E. Alphabet of Lines	Practice drawing the lines used in drawings.	Define and illustrate the alphabet of lines.	Text or handouts
Make a working drawing. Make a basic bill of materials. Construct a plan of procedure.	F. Making and Reading Drawings 1. Sketching 2. Pictorials 3. Orthographic Projection a. Use of graph paper (1) For determining proportions (2) For determining views b. Working drawings G. Bill of Materials (Basic) Format a. Name of part b. Number c. Dimensions H. Plan of Procedure	Construct a basic bill of materials, and plan of procedure upon completion of the working drawing.	Discuss, demonstrate, and illustrate drawing methods and techniques, basic bills of materials, and plan of procedure.	Text, handouts, and/or other available materials.

UNIT TITLE VI ESTIMATING AND SELECTING MATERIALS AND SUPPLIES

INTRODUCTION (PURPOSE/ RATIONALE/ INTENTION)	UNIT GOAL(S)	GENERAL UNIT OBJECTIVES
This unit will stress the characteristics of lumber and lumber products to be selected from, and the caluation of quantities and costs for a particular product.	The student will be able to select and estimate materials needed for products.	At the conclusion of this unit, the student should be able to: Wisely and precisely choose lumber and lumber related products and determine quantities and cost of these materials.

UNIT VI ESTIMATING AND SELECTING MATERIALS & SUPPLIES

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
Upon completion of this unit, students should be able to: Make selections of appropriate materials and supplies needed to construct a project.	A. Materials 1. Lumber Selection a. Hardwoods/softwoods b. Open grain vs. closed grain c. Color d. Grading e. Seasoning (K.D., A.D.) f. Strength/durability g. Working quality h. Estimating (1) Board feet defined (2) Calculating board feet and linear footage 2. Plywood Selection a. Softwood/hardwoods (1) Grades (2) Interior/exterior marine b. Methods of manufacture c. Estimating sheet material 3. Manufactured Board a. Hardboard (1) Tempered (2) Untempered b. Particle board c. Chipboard	Discuss types of wood and wood products characteristics, uses, advantages and disadvantages. Take notes in notebook. Discuss seasoning methods of lumber.	Lead a discussion on types of wood, wood grain, color, seasoning methods, strengths, working qualities, durability, and manufactured wood products along with advantage and disadvantage of each	State guide Catalogs Texts Handouts
	B. Supplies and Hardware 1. Estimating Liquid Coverage a. Finishing materials b. Glues and adhesives c. Estimating quantity 2. Estimating Hardware a. Size b. Styles c. Cost 3. Bill of Material	Prepare sample order of materials, supplies, and hardware from a mail order catalog.	Provide sample catalogs. Discuss and identify types, uses, and sizes of hardware. Discuss estimating amounts of materials and hardware needed for a project.	Sears catalogs Broadhead/Garrett Catalog, etc.

UNIT TITLE VII MATERIAL PROCESSING

INTRODUCTION (PURPOSE/ RATIONALE/ INTENTION)	UNIT GOAL(S)	GENERAL UNIT OBJECTIVES
The purpose of this unit is to provide the student with a working knowledge of the processes used to shape and form wood and wood products.	The student will be able to process stock in a reasonable manner by squaring, gluing, bonding, veneering, and edging.	At the conclusion of this unit the students should be able to: Apply a working knowledge of the processes used to shape and form wood and wood products.

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
At the end of this unit, students should be able to: Cut a piece of stock to a specific dimension. List the tools and operations needed to square off a piece of stock. Shape stock using different hand tools or power tools. Identify and make different kinds of joints. Use veneers, lumber, and plywood to produce desired products. Conceal edges, surfaces, and grains, and decorate edge surfaces using several types of edge materials.	A. Squaring Stock 1. Cutting Stock to Length 2. Squaring B. Gluing and Clamping 1. Purposes 2. Common Wood Glues 3. Clamps 4. Surfacing C. Shaping 1. Tools Used 2. Steaming 3. Kerfing D. Bending (Forming) 1. Steaming 2. Kerfing 3. Combination of 1 and 2 above 4. Green Lumber 5. Anhydrous Ammonia Vacuum Tank E. Veneers 1. Edges 2. Inlays 3. Overlay 4. Plastic laminates F. Plywood 1. Overlay 2. Inlay 3. Laminate 4. Bending 5. Molding G. Edging 1. Chamfering 2. Beveling 3. Molding 4. Veneering	Study appropriate text chapters. Answer study questions. Squaring a piece of stock. Cutting different size joints and grooves on stock using a chisel and other hand and power tools. Cutting different chamfers and bevels. Give various edge to edge, end to end, etc., sample joints (see unit IV). Perform various shaping, bending, and veneering operations using hand and power tools where appropriate.	Lecture on material processing. Demonstration on squaring stock using both hand and power tools. Demonstrate shaping and forming procedures using: 1. Different plans 2. Files and Rasp 3. Shapers 4. Chisels 5. Jigs 6. Fixtures 7. Molding cutters Show films available.	Text Films if available Charts Stanley Tool Guide

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	H. Preservatives 1. Creosote 2. Pinta (Pentachlorophenal) 3. WPC (Wood Plastic Composition) 4. PEG (Polyethylene-glycol) *Prefinishing and finishing operation topics are covered under a separate unit title.			

UNIT TITLE VIII FASTENERS

INTRODUCTION (PURPOSE/ RATIONALE/ INTENTION)	UNIT GOAL(S)	GENERAL UNIT OBJECTIVES
The purpose of this unit is to enable students to identify, select, and use common fasteners in joining woods and other objects to wood.	The student will be able to select and use the proper fasteners for a product.	At the conclusion of this unit the students should be able to: Precisely identify, select, and use fasteners on wood products.

UNIT VIII FASTENERS

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
At the conclusion of this unit, students should be able to: Identify and select common fasteners for various installations and uses. Properly install nails, screws, and other miscellaneous fasteners.	A. Nails 1. Standard Types and Sizes a. Common b. Finishing c. Casing d. Box e. Brads B. Screws 1. Standard Types a. Flat head b. Round head c. Oval head 2. Standard Lengths a. Selection (3/16"-6") b. Installation 3. Standard Sizes (Gage) a. Selection #0-#24 b. Uses 4. Countersinking 5. Counterboring a. Purposes b. Plugs c. Buttons 6. Clearance Holes for Screws a. Shank b. Pilot c. Starter C. Miscellaneous Fasteners 1. Nuts and bolts 2. Dowels 3. Flush Plates 4. Screw Anchors 5. Staples 6. Corrugated fasteners 7. Pinch dogs 8. Adhesives	Study and observe the demonstrations and illustrations of standard types and uses of nails and screws. Discuss selection procedures for the proper types and sizes of nails and screws. Practice installation procedures for nails and screws. Observe other types of fasteners available and learn to use and install them.	Demonstrate and illustrate the standard types and sizes of nails and screws used in woodworking. Discuss selection application, and use of miscellaneous other fasteners.	Texts Illustrations Nail and screw Stanley Tool Guide

UNIT TITLE IX PREPARATION FOR FINISHES

INTRODUCTION (PURPOSE/ RATIONALE/ INTENTION)	UNIT GOAL(S)	GENERAL UNIT OBJECTIVES
The purpose of this unit is to provide the student with a working knowledge of basic techniques in preparation of surfaces for finishing operations.	The student should be able to prepare surfaces for finishing by prevention and corrective means during and after construction operations.	At the conclusion of this unit the student should be able to: Apply proper techniques for finish preparation through prevention and corrective means.

UNIT IX PREPARATION FOR FINISHING

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
At the conclusion of this unit the student will be able to:	A. Surface Glue Elimination 1. Applying Correct Amount 2. Removal Procedures a. Wiping with wet cloth b. Scraping c. Sanding	Observe and discuss methods of surface glue elimination. Practice removal techniques of surface glues.	Demonstrate and discuss proper glue application techniques and methods of removing excess from surfaces.	Text Samples
Prepare a wood surface for finishing. Use preventative and corrective means of preparation during and after construction.	B. Surface Preparation 1. Planing Millmarks Smooth 2. Scraping (curly grained wood) 3. Sanding a. Progress from coarse grade to fine grade b. Final sanding with grain c. Inspection for surface defects 4. Bleaching a. Purpose b. Procedure 5. Grain Raising a. Purpose b. Procedure 6. Distressing a. Purpose b. Procedure 7. Wash Cloth a. Purpose b. Procedure 8. Patching and Repairing a. Steaming dents b. Cracks, defects, and nail holes c. Putty d. Plastic wood e. Wood plugs and patches f. Glue and sawdust g. Spackling	Observe and discuss surface preparation techniques based on type of materials and finishes. Practice methods of: 1. Planing 2. Scraping 3. Sanding 4. Grain raising 5. Distressing 6. Patching and repairing	Demonstrate and discuss wood surface preparation with special emphasis on the effect of various types of finishing materials on different types of woods. Demonstrate the methods of repairing wood surfaces. Provide scrap lumber to students for practice work.	

UNIT TITLE X HARDWARE

INTRODUCTION (PURPOSE/ RATIONALE/ INTENTION)	UNIT GOAL(S)	GENERAL UNIT OBJECTIVES
The purpose of this unit is to provide students with a working knowledge of hardware commonly used in woodworking.	The student will be able to identify, select, and install appropriate hardware for wood products.	At the conclusion of this unit, the student should be able to: Correctly choose and install appropriate hardware items on wood products.

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
At the conclusion of this unit the student will be able to: Identify, choose, and install common hardware items.	A. Surface Hardware 1. Considerations a. Style b. Finish c. Size d. Type 2. Kinds a. Knobs, pulls, and handles b. Hinges (1) Cabinet (2) Butt (3) Decorative c. Metal corners d. Locks e. Hasps f. Surface trim g. Lamp fittings h. Escutcheon pins B. Other Hardwares 1. Drawer Rollers and Guides 2. Catches a. Friction b. Magnetic c. Elbow d. Bullet 3. Lid Chains and Stop Bars 4. Lazy Susan Bearings 5. Metal Shelf Standards and Clips	Correctly identify and select common hardware items for correct purposes and uses. Properly install sample hardware items.	Discuss, identify, and demonstrate installation procedures of hardware items commonly used in woodworking.	Text Hardware installed on display panels. Sample item

UNIT TITLE XI FINISHING TECHNOLOGY

INTRODUCTION (PURPOSE/ RATIONALE/ INTENTION)	UNIT GOAL(S)	GENERAL UNIT OBJECTIVES
The purpose of this unit is to give the student a working knowledge of the types of finishes and techniques used on wood projects.	The student will be able to identify, select, and use appropriate finishes and supplies.	At the conclusion of this unit, the student should be able to: Properly select and apply the various finishing materials to wood products.

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
Upon completion of this unit, the student will be able to: List and describe problems encountered in cleaning, decorating, and preparing a surface for finishing.	A. Preparation 1. Sanding 2. Filing 3. Bleaching 4. Decorating 5. Removing Glues and Adhesives 6. Annealing 7. Pickling 8. Distressing 9. Etching	Practice on a small piece of material.	Lecture and demonstration of various surface preparation techniques.	Selected text references
Select the appropriate finish for a given interior or exterior finishing task.	B. Finishes 1. Opaque a. Paint/enamel (1) Latex base (2) Lacquer base (3) Dyes b. Primers c. Epoxies 2. Transparent a. Shellac b. Lacquer c. Sealers d. Stains (1) Oil (2) Water (3) Spirit 3. Binding 4, Padding 5. Spotting 6. Glazing 7. Multi-color	Discuss types of finishes and list application procedures. Read and follow printed instruction on containers. Apply a given finish to a project.	Lecture and demonstration of finishes. Set up a display area featuring different materials. Show and discuss film or film strip, as available.	Selected color charts Field trip to cabinet shop, metal shop, ceramic shop, art gallery, printing shop, and/or furniture store.

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
Choose and apply the correct solvent for the finishing job at hand.	C. Solvents 1. Water 2. Mineral Spirits 3. Alcohol 4. Lacquer Thinner 5. Turpentine 6. Acids	Clean finish applicator with proper solvent after use. Correctly thin finish materials.	Lecture and demonstration Stress safety involving solvents.	Text Display charts
Demonstrate the ability to change the appearance of a product by applying a suitable finish.	D. Application 1. Brush 2. Spray 3. Dip Coating 4. Wiping	Apply a finish to a fabricated product.	Lecture and demonstration	Selected text references
Differentiate supplies from materials.	E. Supplies 1. Brushes 2. Rags 3. Newsprint 4. Rotten Stone 5. Rubbing Compound 6. Polishing Compound 7. Pumice Stone 8. Steel Wool 9. Wet/ Dry Abrasives	List the supplies and materials required to finish a project.	Conduct a tour of the finishing area. Display selected supply items.	Display charts Shop supply and hardware catalogs Newspaper ads
	F. Materials 1. Paints/ Enamels 2. Thinners and Solvents 3. Fillers a. Liquid b. Paste 4. Varnish a. Satin b. Gloss 5. Tung Oil 6. Oil colors 7. Stains a. Oil b. Water c. Spirit 8. Sealers		Display selected finishing materials.	

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
Compare the many types of coverings and trims applied to surfaces.	G. Surface Covering and Trim 1. Laminates 2. Flocking and/or Felt 3. Decals and Appliques 4. Vinyl, Contact Paper, Cloth, Leather, etc. 5. Moldings 6. Miscellaneous	List materials and trim found in the home.	Lecture and display of materials.	Fine furniture brochures and catalogs. Department store catalogs
Demonstrate good safety skills, attitudes, and habits while working with finishing materials and supplies.	H. Finishing Safety 1. Ventilation 2. Storage a. Rags and solvents b. Finishing materials 3. Toxic Materials a. Odors b. Irritants c. Gases 4. Eye Protection 5. Respirators 6. Fire Extinguishers	Prepare safety posters. Copy safety rules in notebooks.	Introduce related safety equipment, its care and proper function.	

UNIT TITLE XII MASS PRODUCTION

INTRODUCTION (PURPOSE/ RATIONALE/ INTENTION)	UNIT GOAL(S)	GENERAL UNIT OBJECTIVES
The purpose of this unit is to enable students to analyze and cluster operating tools and workers for efficient production of large quantities of a specific product such as Industry.	The student will apply industrial production techniques to products designated for mass production performed in exercises.	At the conclusion of this unit the student should be able: Analyze and cluster operations, tools, and workers for the efficient production of large quantities of a specific product.

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
At the conclusion of this unit the student will be able to: Analyze a product for the purpose of mass production. Identify types of company ownerships and choose an appropriate type for simulation. Establish an efficient flow system for production. Modify existing tools and equipment for mass production run. Develop efficient storage, packaging, and shipping methods. Team with others in a successful joint effort.	A. Business and Finance 1. Types of Company Ownership a. Proprietorship/Partnership b. Corporation (1) Sell certificates and shares (2) Profit sharing and losses (3) Meetings of stock holders (4) Legal requirements (5) Dissolving a corporation 2. Accounting a. Capital available b. Production costs c. Sales d. Profits/losses e. Share distribution B. Market Research/Product Selection 1. Determining Market for Products a. Utility b. Desirability/Need c. Cost analysis 2. Product Selection C. Product Design and Engineering 1. Sketching and Designing 2. Product Simplification 3. Standardization of Parts 4. Working Drawing 5. Pilot Model/Prototype	Discuss, take notes, and study the types of company ownerships. Discuss and study the principle of mass production and how it relates to industry. Discuss and determine the type of company ownership that is suited for the class. Discuss, research, and select a product for mass production. Determine through discussion and sketching, the basic features of the product to be mass produced. Study and analyze mass produced items.	Discuss types of company ownership, advantages and disadvantages of each. Discuss how mass produced items will yield higher profits because of the efficient production methods utilized by industry. Discuss different types of company ownerships. Discuss with students products for mass production simulation. Discuss with students the basic features of the product. Have students study and commonly analyze mass produced items.	Modern Woodworking, Wagner (Goodheart-Wilcox Publishers) *Junior Achievement Advanced Woodwork and Furniture Making, Feirer Hutchings (Charles Bennett) Various wood items known to be mass produced.

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	(1) Type of materials (2) Operations (3) Finishing methods (4) Modifications D. Production Engineering 1. Tooling Up a. Machine and tool set-up and modifications	Observe, discuss, and assist with construction of the pilot model.	Develop a working drawing for a selected product design and have the class assist and observe the construction of the pilot model or prototype.	
	b. Jigs c. Fixtures 2. Equipment Layout and Production Lines a. Production line analysis	Discuss pilot model and analyze for modifications.	Discuss with students the pilot model and determine if modifications are needed.	Selected furniture manufacture.
	b. Organization of machines, materials, and workers c. Inspection stations	Analyze and discuss operations and develop a flow chart for the mass produced product.	Analyze operations involved on pilot model, and develop with students a flow chart.	
	E. Storage, Packaging, and Shipping 1. Materials storage 2. Product storage 3. Packaging methods 4. Shipping methods F. Sales	Discuss and develop ideas for jigs and fixtures for the production line.	Develop a production line and organize the machines, tools, and workers for best efficiency.	
		Produce finished product.	Develop jigs and fixtures needed for production.	
		Analyze and discuss mass production techniques.	Supervise production.	
		Distribute mass produced products.	Analyze and discuss product.	
			Release products for distribution.	

UNIT TITLE XIII PORTABLE POWER TOOLS

INTRODUCTION (PURPOSE/ RATIONALE/ INTENTION)	UNIT GOAL(S)	GENERAL UNIT OBJECTIVES
In this unit the student will be given instruction and experiences in safe and proper use of portable power tools. Teachers should use caution in the use of power tools regarding safety, parental permission, etc., for possible litigation complications.	The student will demonstrate the skills necessary for safe operation of portable power tools.	At the conclusion of this unit, the student should be able to: Use the knowledge and experiences to use portable power tools safely and properly.

UNIT XIII PORTABLE POWER TOOLS (WOODWORKING)

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
Upon completion of this unit students should be able to: Identify types of major parts and uses of portable power tools used in woodworking. Adjust and operate portable power tools for safe and efficient use. Perform various cuts using portable power sawing tools freehand and with attachments and accessories. Perform drilling, shaping, and planing operations using portable power tools. Produce flat and/or smooth wood surfaces using portable power sanders.	A. General Safety 1. Selecting Proper Tool a. Purpose b. Size c. Capacity 2. Importance of Adjustments 3. Use of Safety Equipment a. Safety glasses b. Handles and guards c. Aprons d. Respirators e. Proper electrical grounding 4. Changing Cutters a. Disconnecting power b. Securing position c. Proper direction of rotation 5. Safe Use of Tools a. Speed (if variable) b. Feed (1) Speed (2) Direction c. Securing work d. Handling the tool B. Sawing Tools 1. Portable Power Saw a. Adjustments (1) Depth of cut (2) Baseplate angle b. Blades (1) Types (2) Installation c. Layout lines are needed for all cuts d. Operations (1) Straight cuts (2) Miter cuts (3) Bevel cuts (4) Compound cuts (5) Attachment and accessories	Sign and have parents sign safety pledge and consent letter. Closely examine tools and their major parts, attachments, and accessories. Copy, read, and/or study information concerning portable power tool use and safety. Discuss portable power tools during class lectures. View films, slides, and transparencies concerning portable power tools. Observe and examine wood projects outside the school. Observe instructors' demonstrations of portable power tools. Practice the safe use of portable power tools. Produce a finished project using portable power tools.	Issue safety pledges and parental consent letters. Obtain and issue to students printed information concerning portable power tool use and safety. Organize and present lecture series concerning portable power tools. Guide class discussions. Obtain and present a wide variety of visual aids. Encourage student awareness of woodwork in community and home environment. Demonstrate and Model safe and proper use of portable power tools. Issue and supervise student practice assignments. Correct improper performances. Assign practical projects using portable power tools.	Textbooks Other reference books, magazines, and publications Visual Aids Printed Handouts Community Craftsmen Appendix

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	e. Sawing techniques f. Safety 2. Portable Electric Jig Saw a. Major parts b. Adjustment--tilting base plate c. Blades (1) Installation (2) Selection d. Layout lines are needed for all cuts e. Operations (1) Straight cuts (2) Regular and irregular curves (3) Internal cuts (4) Bevel cuts (5) Attachment and accessories f. Sawing techniques g. Safety C. Boring Tools —Portable Electric Drills 1. Major Parts 2. Bits a. Installation b. Types (1) Twist (2) Spade (3) Combination bits (4) Countersinking (5) Hole saw 3. Drilling Techniques 4. Safety D. Shaping Tools —Portable Router 1. Major Parts 2. Adjustments —Depth of Cut 3. Bits a. Types-select common types b. Installation 4. Operations a. Making joints b. Decorative edges and faces			

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	c. Freehand 5. Using Patterns and Templates 6. Attachments and Accessories a. Guides b. Templates 7. Safety E. Sanding Tools 1. Portable Belt Sander a. Major parts b. Belts (1) Choosing grit size (2) Installation--DIRECTION OF TRAVEL (3) Tracking adjustment c. Operation--rough and medium d. Sanding techniques (1) Face grain (2) Edge grain (3) End grain e. Safety 2. Finishing Sanding a. Major parts b. Abrasive paper (1) Choosing grit size (2) Installation c. Operation-Finish sanding d. Safety 3. Disk Sander a. Operations b. Techniques c. Safety d. Attachments-buffing and polishing			

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	F. Power Miter Box 1. Operations-cutting Miters and Compound Angles 2. Techniques 3. Safety			
	G. Edge Cutting Tool-Portable Planer 1. Operations a. Face planing b. Edge planing c. End planing 2. Techniques 3. Safety			

UNIT TITLE XIV STATIONARY POWER TOOLS

INTRODUCTION (PURPOSE/ RATIONALE/ INTENTION)	UNIT GOAL(S)	GENERAL UNIT OBJECTIVES
The purpose of this unit is to give students a limited amount of exposure to the most common stationary power tools found in the woods laboratory. More advanced and mature students will have the opportunities to use these tools on a more frequent basis.	The student will demonstrate the skills necessary for safe operation of stationary power tools.	At the conclusion of this unit, the student should be able to: Identify and safely use common stationary power tools.

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
At the conclusion of this unit the student will be able to:	A. Safety 1. Guards and Safety Equipment 2. Operator Zones 3. Specific Safety Rules	Identify, discuss, and study the various stationary power tools.	Identify, discuss, and demonstrate the power tools.	Text
Identify and safely use stationary power tools.	B. General Information 1. Size H.P. ratings 2. Accessories 3. Types of Cutters, Blades, and Bits 4. Nomenclature 5. Adjustments	Pass a safety test on each, as a prerequisite to use of the machines.	Discuss the specific safety rules and data for each machine.	Lab Machines
	C. Use of Stationary Power Tools (recommended list, others are optional) 1. Circular Saw a. Basic cuts b. Basic procedures c. Push sticks/surfacer 2. Thickness Planer a. Rough stock (1) Facing boards (2) Checking for uneven thickness b. Thickness of cuts c. Feed rates d. Direction of feed for wavy grained stock 3. Jointer and Uniplane a. Warped/rough stock b. Maximun thickness of cut c. Types of basic cuts d. Push paddles or sticks 4. Tool Grinder a. Grinding procedures b. Sharpening c. Coolants/lubricants 5. Drill Press a. Drilling and boring b. Mortising c. Molding cutters	Practice, set-up, and use machines under supervision of instructor.	Discuss and demonstrate each machine and then supervise students in the use of each. Administer tests and keep appropriate records. Secure parental permission/consent forms from students.	See safety information in General Industrial Arts Curriculum Guide.

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	6. Band Saw a. Re-sawing b. Sawing curves c. Sawing straight cuts d. Sawing bevels e. Multiple sawing 7. Scroll Saw a. Internal cuts b. External cuts c. Bevel cuts d. Multiple sawing			

UNIT TITLE XV OCCUPATIONAL INFORMATION

INTRODUCTION (PURPOSE/ RATIONALE/ INTENTION)	UNIT GOAL(S)	GENERAL UNIT OBJECTIVES
The purpose of this unit is to provide information and suggest sources of occupational guidance.	The student will compare occupations related to woodworking.	At the conclusion of this unit, the student should be able to: Make tentative decisions on occupational choices in the field of lumber, wood, and wood oriented industries.

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
At the conclusion of this unit the student should be able to: Compare occupations related to the wood industry. Determine educational requirements necessary to pursue a specific career.	A. The Wood Industry 1. Construction a. Housing b. Office buildings c. Bridges d. Schools e. Churches 2. Manufacturing a. Furniture b. Cabinets c. Doors d. Windows 3. Service a. Repairs b. Engineering c. Architects 4. Transportation a. Logging and milling b. Lumber c. Product	Discuss and study the spectrum of wood-related jobs. Discuss the criteria to be used in career selection. Discuss the classifications of the job market and the relationship of job security, pay, and job descriptions. Research information in careers of students' choice.	Discuss and illustrate the broad spectrum of the wood industry. Discuss the criteria to be used in selection of a career. Discuss the different classifications of the job market with examples of job descriptions. Discuss informational sources and employment outlook for various careers.	Constructing and Manufacturing Wood Products, by Wayne H. Zook (McKnight Publishing) Occupational Outlook Handbook Resource Persons Field Trips
	B. Career Opportunities 1. Considerations a. Personality b. Mental abilities c. Physical abilities d. Interests e. Job descriptions f. Educational requirements			Films and film strips
	C. Job Classifications 1. Unskilled a. No required training b. Physical c. Material moving/handling 2. Semi-Skilled a. Some special training b. O.J.T. (On-the-Job-Training)			Records Cassettes Charts Newspaper Ads Trade Manuals Periodicals

OBJECTIVES/TIME ALLOTMENT	TOPICS	STUDENT ACTIVITIES	TEACHER ACTIVITIES	RESOURCES
	c. Machine operators/ operatives 3. Skilled a. Craftsmen/Tradesmen/ Skilled Mechanics b. Performs all tasks of the trade c. Journeymen (1) Apprenticeship (2) Classroom instruction d. Skilled crafts (1) Carpentry (2) Cabinetmaking (3) Pattern making 4. Semiprofessional a. Retail lumber salesman b. Drafts person 5. Professional a. Forester b. Engineer c. Architect d. Furniture designers e. Real estate broker f. Banker g. Manager h. Teachers			

APPENDIX A

BASIC WOODWORKING EQUIPMENT (SUGGESTED INVENTORY)

NUMBER	DESCRIPTION
1	Tool Grinder (Bench)
1	10" Tilting Arbor Circular Saw
1	6" Jointer or Uniplane
1	18" Planer (Surfacer)
1	15" Drill Press
2	12" Wood Lathes
2	24" Scroll Saws
1	14" Band Saw
1	Shop Vacuum (Wet/Dry)
1	Belt Sander, 3"x 24"
1	Finishing Sander (Vibrating)
1	Router
1	Saber Saw
1	7" Circular Saw, Portable
1	Dado Set (Table Saw)
1	Molding Head and Knives
2	Turning Chisel Sets (Lathe)
1	Router Bits (Carbide) Assorted--(Router)
1	Miter Box and Saw
24	Vises, Woodworking
6	Workbenches, 4 Station
2	Metal Storage Cabinet (Flammable Materials)
1	Safety Container (Oily Wastes)
2	5 gal. Safety Fluid Container
24	Safety Goggles
6	Safety Face Shields
1	First-Aid Kit
24	Hearing Protectors/Plugs
4	Dust Masks (Throw Away Type)
1	Exhaust System to remove dust, fumes, etc.
2	Eagle Oilers
1	Norton Soft Arkansas Stone

BASIC WOODWORKING TOOLS (SUGGESTED INVENTORY)

NUMBER	DESCRIPTION
4	Awls, 6" Scratch
2	Bevel-T, 8" Sliding
2	Bits, Auger #4-#16 Sets (1/4"-1")
1	Bit, Expansive
1	Bits, Spade (set), 3/8"-1"
1	Bits, Twist drill set (1/16" by 1/2" by 64ths)
2	Braces, Bit
2	Bits, Countersink
2	Bits, Screwdriver (3/8" & 1/2")
12	Brushes, Bench (1/2, 3/4 & 1")
2	Calipers, 8" O.S.
2	Calipers, 8" I.S.
2	Chisel, Sets 1/4" - 1"
1	Chisel, Carving Set
4	Cord, Extension - 25'
10	Clamps, Bar (3' - 5')
12	Clamps, Hardscrew
6	Clamps, "C" (12", 8", 4")
4	Clamps, Strap
1	Dividers, 8"
6	Files, Wood (Double-Cut), 10"
4	Files, Mill, 10"
2	Files, Saw (3-corner), 6"
2	File, Surform, 10"
2	File, Rasp
12	File Handles
12	File cards
4	Hammer, Claw 7 oz.
6	Hammer, Claw 13 oz.
2	Hammer, Claw 16 oz.
2	Hand Drills
1	Doweling Jig
2	Plug Cutters, 3/8" & 1/2"
6	Putty Knives
6	Knives, Utility 6"
1	Level, 24"
4	Mallets, Wood

NUMBER	DESCRIPTION
4	Planes, Block 6"
1	Pliers, Side Cutter 7"
1	Pliers, Needle-nose 6"
6	Pliers, Adjustable
2	Pliers, Vise-grip
12	Rules, Bench - 24"
4	Rules, Folding (or Tapes)
6	Saws, Back
6	Saws, C.C. 10 pt.
4	Saws, Rip 5 1/2 pt.
2	Saws, Dovetail
1	Saw, Compass
4	Saw, Coping
1	Screwdriver Set, Standard Tip
1	Screwdriver Set, Phillips Tip
2	Screw-Mate Set
4	Squares, 24" Framing
2	Squares, 12" Steel
2	Squares, Combination 12"
6	Squares, Try 8"
1	Wrench, Adjustable 10"
1	Wrench, Set, Std. open end and boxed end
1	Soldering Gun, 100 Watts
1	Combination Square Set (Try, Protractor, and Center)
1	Trammel Point Set
1	Set of Miter Clamps
1	Hacksaw
1	Mallet, Rubber
6	Nail Set
6	Planes, Jack 14"
2	Planes, Smooth 9"

BASIC WOODWORKING SUPPLIES/MATERIALS (SUGGESTED INVENTORY)

(Per section of 24 Students)

SUPPLIES/MATERIALS	QUANTITY	OTHER
1" Lumber	250 BF	Any Combination
1/4" Plywood	2 Sheets	Any Combination
1/2" Plywood	2 Sheets	Any Combination
Stain	4 gallons	Walnut, Mahagany, Oak
Shellac/or Sanding Sealer	6 quarts	
Clear Finish	8 quarts	Varnish, Deft, Urethane
Paint	4 quarts	White, Black, Etc.
Filler, Paste	1 quart	
Patching Putty	2 pounds	
Abrasive Paper	3 sleeves (300 sheets)	Extra fine, Fine, Medium
Steel Wool	2 pounds	0000-0
Paste Wax	2 pounds	
Sander Belts	10	Fine, Medium, Coarse
Coping Saw Blades	100	10, 12, 14 teeth
Scroll Saw Blades	100	10, 12, 14 teeth
Saber Saw Blades	30	Fine, Medium, Coarse
Lube Oil	1 quart	30 wt.
Kerosene/Varsol	5 gallons	

BASIC WOODWORKING SUPPLIES/MATERIALS (SUGGESTED INVENTORY)

(Per section of 24 Students)

SUPPLIES/MATERIALS	QUANTITY	OTHERS
FH Wood Screws	4 boxes 100	1/2" #4, 3/4" #6, 3/4" #8, 1" #8
FH Wood Screws	3 boxes 100	1 1/4" #9, 1 1/2" #10, 2" #10
White Glue (liquid)	6 pints	Weldwood, Titebond or equal
Plastic Resin Glue (powder)	4 pounds	Water Resistant
Rubbing Compound	2 pounds	Or Pumice Stone
Polishing Compound	2 pounds	Or Rotten Stone
Turpentine	2 gallons	Type of Thinners
Alcohol, denatured	1 gallons	Depends on selection of Finish Materials
Lacquer Thinner	1 gallon	

Industrial Arts Teachers

SUGGESTED PREPARATIONS FOR OPENING SHOP TO STUDENTS

Shop Facilities -

1. Make a visual check of the physical conditions of your shop and storerooms.
2. Check electrical switches, lights, outlets, gas, and air outlets.
3. Check fire extinguishers. Are emergency fire drill instructions in place? (Don't forget to demonstrate how fire extinguishers are used during your safety lessons. Sometimes local fire officials are happy to help give demonstrations.)
4. Make sure chairs are in place.
5. Place information forms in the order in which they will be used.

Equipment - Be sure that:

1. Machines are lubricated and adjusted.
2. All guards and safety equipment are in place.
3. Machines are clean and in operating condition.
4. Cutters and blades are sharp.

Tools - Be sure that:

1. Tools are in their proper place on tool panel.
2. Hand tools are sharpened and adjusted.
3. Tools necessary for first demonstration are ready for use.

Supplies -

1. Have stock cut and ready for first demonstrations.

Sanitation - Be sure that:

1. There is ample supply of paper towels, soap, and wiping cloths on hand.
2. You have a clean shop coat.
3. School supplies/aprons are clean and in place.
4. Eye safety devices are cleaned and sanitized.
5. There is a sufficient supply of brooms and brushes.
6. Wash-up and drinking facilities are clean and in working order.

Teaching Materials - Be sure that:

1. Films are ordered and confirmed.
2. Ample supply of chalk and erasers is available.
3. Audiovisual equipment for first lesson is on hand.
4. Record book, teacher handbook, and class lists are on hand.
5. Spare pencils are on hand.

SHOP CLOSING GUIDE

Experienced industrial arts teachers have some idea what needs to be done to prepare for closing shop. Teachers in their first year may or may not be aware of what should be included in their planning. Most shops and labs can be made ready for the summer recess in a mere two or three days, if a planned program for shop closing is followed.

Some of your pupils may not have time to start another project or work unit near the end of the year. These pupils can be assigned to do various things that need to be done to close the shop or lab for summer break. You may prepare a list of such jobs on individual cards. Let the students "volunteer" and pick the job or jobs they would like to do.

What to Do

First of all, discuss next year's assignment with your principal or supervisor. It might require that some physical changes be made in your shop. You may have to enter a supplementary requisition for additional tools and materials. (Make all your requests in writing and keep a copy for your file.)

After this, consider the following checklist:

I. Shop or Lab Facilities

1. Have shop painted if necessary.
2. Fill out requests for minor repairs such as replacement of broken or cracked windows, faulty locks, damaged or frayed electric cords, and for checking and recharging fire extinguishers.

II. Equipment and Furniture

1. Check, clean, lubricate, and repair machinery.
2. Request major repairs and repair parts.
3. Remove blades and cutters from machines.
4. Oil/or wax machine surfaces to prevent rust.
5. Paint machines and furniture as necessary.
6. Repair and refinish bench tops as necessary.
7. Reline soldering, forging, and melting furnaces.
8. Shut off gas and turn off compressor. Bleed lines if necessary.
9. Conduct an inventory.

III. Tools

1. Clean, repair if needed, sharpen.
2. Construct, repair, paint tool holders.
3. Oil or wax to prevent rust.
4. Pack edge tools for sharpening--saws, blades, cutters, etc.

IV. Supplies

1. Clean and arrange storage areas.
2. Prepare requistion and/or supplementary requisitions for next year.
3. Inventory and store new supplies as they are received.

V. Sanitation

1. Clean, repair, sanitize and store safety glasses and shields.
2. Clean and sanitize safety glasses storage cabinet.
3. Inventory safety equipment.
4. Collect aprons and shop coats for laundering if your school offers this service.
5. Clean all lockers.
6. Discard useable odds and ends that have accumulated during the school year.
7. Discard supplies (paint, varnish, etc.) in cans that cannot be sealed.
8. Clean wash-up area.
9. Clean used paint brushes and discard them if they are too bad.
10. Remove all trash and rubbish.
11. Remove all volatile fluids or store in proper containers.

VI. Teaching Materials

1. Collect and store all books.
2. Return audiovisual equipment to central storage.
3. Construct, repair, and store all audiovisual material.
4. Duplicate forms, safety tests, measurement tests, etc. for next year.

5. Order paper, duplicater supplies, chalk, etc.. for next year.

VII. Administration

1. Send grades, forms, requests, etc., to appropriate people or offices.
2. Complete necessary departmental reports for office.
3. Turn in study guides, course of study, handbooks, inventories, etc.
4. Tag and turn in keys.

VIII. Security

1. Lock tool storage cabinets.
2. Check and lock windows and outside doors.
3. Lock electrical panel; be sure electricity and gas have been turned off.
4. Lock storage areas.
5. Lock your desk, personal storage cabinet, and office.
6. Close and lock the shop.

COURSE EVALUATION

Purpose:

This evaluation is an effort by your instructor to ascertain his/her teaching effectiveness and the usefulness of course materials. It is designed to provide suggestions on how the course can be improved and be made more relevant to students' needs. Your cooperation will be greatly appreciated.

Instructions:

Below is a list of qualities dealing with the course and the instructor. You are asked to evaluate these qualities on a scale of four to one. Four is the highest ranking, and one is the lowest ranking. Any comments you wish to add may be included on the back of this sheet.
DO NOT SIGN THIS SHEET.

		Rankings			
		Highest			Lowest
1.	The class sessions and lectures were well organized.	4	3	2	1
2.	The course textbook was very helpful.	4	3	2	1
3.	The course was interesting and enjoyable.	4	3	2	1
4.	The course material satisfied my educational needs in this area.	4	3	2	1
5.	The tests used in the course contributed to greater learning.	4	3	2	1
6.	Material presented in the course was easy to learn and to apply.	4	3	2	1
7.	The instructor displayed a sense of professionalism and dignity in the class.	4	3	2	1
8.	The instructor seemed personable and genuinely interested in the students.	4	3	2	1
9.	The instructor has a thorough knowledge of his subject matter.	4	3	2	1
10.	The variety of presentation methods was good.	4	3	2	1
11.	The instructor displayed a sense of humor.	4	3	2	1
12.	The instructor was clear in his explanation of course material and assignments.	4	3	2	1
13.	The instructor always seemed prepared for class meetings.	4	3	2	1
14.	The instructor always displayed a pleasant appearance.	4	3	2	1
15.	The instructor provided for all students to participate.	4	3	2	1
16.	The instructor was patient and resourceful.	4	3	2	1

INDUSTRIAL ARTS FIELD TRIP

DATE: ______________________________

PLACE: ______________________________

LEAVE: ______________________ AT: ____________
SCHOOL

RETURN TO ______________________ AT: ____________
SCHOOL

FEES: (1) TRAVEL. . . . . ______________________

(2) MEALS . . . . ______________________

(3) ENTRY FEE . . . . ______________________

(4) OTHER . . . . ______________________

My daughter/son ______________________, has my permission to attend the Industrial Arts Field Trip to ______________________ in ______________________, La., on ______________________. It is my understanding that transporatation will be provided by a Parish school bus and/or private car. Students will be accompanied by Industrial Arts teachers.

____
(PARENT OR GUARDIAN)

____
(DATE)

My son/daughter ______________________ has my permission to use his/her car or truck to transport student projects from ______________________ ______________ High School to ______________________ and back.

____
(PARENT OR GUARDIAN)

____
(DATE)

Color:

Colors should be used to create a pleasant work area (attitude) and to reduce glare. Light pastels are best for walls, partitions, and ceiling areas. There is no agreed standard for "color coding" machines or equipment, but use of different colors or shades of the same color is an excellent way to differentiate between various parts. This method can also be used to emphasize a hazardous area, point of operation or nip point, etc. Most equipment color suggestions would follow this basic ASA (American Standards Association) ZR53 color system:

Basic Unit	Gray or Green (by tradition)
Parts which may cut, crush or shock (guards)	Orange
Parts that move - or project (warning)	Yellow (or black and yellow stripes)
"Stop" Buttons or switches	Red
Unit under repair	Blue

Other color suggestions:

Fire alarm boxes, exit signs, fire extinguishers, barricade lights - danger signs	Red
First aid kits - stretcher equipment - safety signs	Green
Traffic zone markings	Black, white (or black and white stripes)
Housekeeping markings	Yellow, black and yellow

The personal system you choose must be standard throughout your laboratory. New equipment should be touched up or painted to match existing equipment.

Safety consideration is a critical requirement of facility planning and can "pre-solve" many future safety problems.

We strongly suggest that all Industrial Arts instructors use this color guide for their labs within three years after distribution of this booklet.

ABRASIVE GRADING CHART (Comparison of mesh and grit numbers)

Classification and Use	Artificial	Natural		
	Silicon carbide, aluminum oxide	Garnet	Flint (quartz)	Emery
Extra coarse (sanding coarse wood texture)	12			
	16	16(4)		
	20	20(3½)		
Very coarse (second stage in sanding wood texture)	24	24(3)		
	30	30(2½)	Extra Coarse	Very Coarse
	36	36(2)		
Coarse (third stage in sanding wood texture)	40	40(1½)		
	50	50(1)	Coarse	
Medium (removing rough sanding texture)	60	60(½)		Coarse
	80	80(0)	Medium	
	100	100(2/0)		Medium
Fine (first stage in sanding before applying finish)	120	120(3/0)		
	150	150(4/0)	Fine	Fine
	180	180(5/0)		
Very fine (second stage in sanding before applying finish)	220	220(6/0)	Extra Fine	
	240	240(7/0)		
	280	280(8/0)		
Extra fine (rubbing between finish coats)	320	320(9/0)		
	360			
	400	400(10/0)		
	500			
	600			

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SELECT THE FINISH THAT BEST SUITS YOUR NEEDS

COMMON FINISHES	MATERIALS USED ON	SOLVENT*	DRYING TIME BETWEEN COATS	CHARACTERISTICS	
				GOOD	POOR
STAIN					
Water	Wood	Water	8 hrs.	Easy to use Good penetration Inexpensive	Raises the wood grain **
Vinyl	Wood	Water	1 hr.	Water cleanup Choice of colors Brush or Wipe on	
Oil	Wood	Mineral Spirits	8 hrs.	Easy to use Rich color Brush on and wipe off when desired shade is reached	
CLEAR WOOD FINISHES					
Clear Wood Finish (Deft)	Wood	Lacquer Thinner	20 min.	Can be brushed or sprayed Shows no brush marks Easy to apply Doesn't darken with age Easy touch-up Resists water, heat, and alcohol	
Acrylic (Wood Armor)	Wood	Water	1 hr.	Easy to use Water cleanup Dries clear	Two or more coats should be applied
Lacquer	Wood	Lacquer Thinner	15 min.	Usually sprayed, but can be brushed on or applied by dipping	Requires two or more coats Toxic (poisonous) fumes
Varnish, Polyurethane	Wood Metal	Mineral Spirits	24 hrs.	Clear, tough, hard Resists oil, water, and alcohol	Hard to touch-up
Shellac	Wood	Alcohol	2 hrs.	Easy to apply Good penetration Good Sealer	Poor resistance to heat Not waterproof
PENETRATING OILS					
Mineral Oil	Wood	Mineral Spirits	4 hrs.	Easy to apply Non-Toxic Good to use on cutting boards	Not permanent
Danish Oil (Watco)	Wood	Mineral Spirits	4 hrs.	Easy to apply Toughens wood surface	May discolor finish coat if not sealed
PAINT					
Enamel	Wood Metal	Mineral Spirits	12 hrs.	Waterproof Can be brushed or sprayed Tough, hard	
Latex	Wood	Water	4 hrs.	Odorless Water cleanup	
Lacquer	Metal	Lacquer	15 min.	Usually sprayed, but can be brushed on or applied by dipping Resists water, heat, and alcohol	Requires two or more coats Toxic fumes
WAX	Wood Metal Plastic	-	10 min.	Portects surface Makes the surface shine Can be used alone or applied over other finishes	

* Material used to thin the finish and for cleanup.
**Causes the wood fibers to rise up. This makes the surface rough.

WOOD FINISHING CHART

Step #	Operation
1.	Raise the grain with water. Sand when dry.
2.	Water stain; any color.
3.	Oil stain; any color.
4.	Ivory oil stain.
5.	Bichromate of potassium.
6.	Poster paint; any color.
7.	White shellac; one thin coat.
8.	Paste wood filler; Walnut.
9.	Paste wood filler; Natural.
10.	White shellac; 4 coats.
11.	Varnish; 4 coats.
12.	Enamel; 4 coats.
13.	Sanding sealer; 3 coats.
14.	Brushing lacquer; 2 coats.
15.	Spraying lacquer. 2 coats.
16.	Linseed oil to bring out grain.
17.	Oil stain; Brown.
18.	Linseed oil; Rubbed many coats.
19.	Wood filler; Silver, Gray.
20.	Sand between coats; No. 3/0 sandpaper.
21.	Sand last coat; No. 6/0 and 3F pumice, wet in oil (Rubbing Oil)
22.	Paste wood filler; White.
23.	Maple oil stain.
24.	Steel wool; No. 2/0.
25.	Wire brush.
26.	Rottenstone and oil, with felt pad. (Rubbing Oil)
27.	Paste floor way.
28.	Picture transfer.
29.	Shellac, rubbed; many coats.
30.	Shellac; 1 coat to hold pitch.
31.	Dextrine glue.
32.	Chlorax, or other bleaches. (Poison)
33.	Water stain; Brown.
34.	Borax solution; (Neutralizer)
35.	Flat varnish, 2 or 3 coats.
36.	Sand after second coat; No. 3/0 sandpaper.
37.	Silver gray, oil stain.
38.	Wood filler; colored to match stain.

NOTE: Rubbing oil made of 1/2 kerosene and 1/2 machine oil.

Wood		Remarks	Operation Numbers
Black Walnut	1	Light rubbed varnish finish	7 8 11 20 21 26 27
Black Walnut	2	Dark rubbed varnish finish	8 11 20 21 26 27
Black Walnut	3	Rubbed oil finish	8 18
Red Cedar	1	Light rubbed shellac finish	10 20 21 26 27
Red Cedar	2	Dark rubbed varnish finish	16 11 20 21 26 27
Red Cedar	3	Light clear lacquer finish	13 20 15 21 26 27
Gum Wood	1	Rubbed shellac on figured gum	16 10 20 21 26 27
Gum Wood	2	Walnut imitation on plain gum	1 33 24 11 20 21 26 27
Birch	1	Natural clear lacquer finish	13 14 20 21 26 27
Birch	2	Water stained rubbed varnish	1 2 24 11 20 21 26 27
Maple	1	Oil stained rubbed varnish	23 11 20 21 26 27
Maple	2	Natural rubbed shellac finish	10 20 21 26 27
Maple	3	Old English finish	1 5 24 11 20 21 26 27
Maple	4	Bleached	32 34 13 20 14 21 26 27
Mahogany	1	Water Stained rubbed varnish	1 2 24 38 11 20 21 26 27
Mahogany	2	Oil stain rubbed varnish	3 7 38 11 20 21 26 27
Mahogany	3	Spanish finish	1 33 24 22 7 27
Mahogany	4	Silver grey rubbed shellac	37 19 10 20 21 26 27
Mahogany	5	Bleached lacquer finish	32 34 22 13 20 14 21 26 27
Mahogany	6	Natural rubbed varnish finish	9 11 20 21 26 27
Quartered Oak	1	Natural rubbed varnish finish	9 11 20 21 26 27
Quartered Oak	2	Stained rubbed varnish finish	17 7 8 11 20 21 26 27
Plain Oak	3	Stained rubbed varnish finish	3 7 38 11 20 21 26 27
Red Wood	1	Natural varnish finish	11 20 21 26 27
Red Wood	2	Weathered flat varnish finish	1 5 35
Oregon Pine Or	1	Vertical grain rubbed shellac	10 20 21 26 27
Douglas Fir	2	Pickle finish flat varnish	4 30 35 20
Douglas Fir	3	Slash grain; rubbed varnish	3 30 11 20 21 26 27
Douglas Fir	4	Slash grain wire brushed	25 4 21 24 27
Sugar Pine Or	1	Natural white shellac finish	10 20 21 26 27
White Pine	2	Poster paint shellac finish	1 6 10 36 21 26 27
White Pine	3	Enamel and transfer	30 12 20 21 26 28 27
White Pine	4	Crackle finish	31 6 10

Working sketch or
drawing required with
this form.

PROJECT PLANNING

Name(s)________________________________ Class/Period_______________

Project Name____

Type of Project: Individual ________ Group________ Mass Production__________

Date Begun____________ Estimated Completion Date______________

PLAN OF PROCEDURE

OPERATIONS	TOOLS REQUIRED PER OPERATION
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Instructors Approval:____________________________________
Comments:____

Date Completed____________ Total hours spent on project________________

Working Drawing Grade ______________ Final Project Grade______________

Comments:____

PROJECT BILL OF MATERIALS

PART A: Finished dimensions of assembled parts. *Parts layout sheet (graph paper etc.) recommended.

Part #	No. of Pcs.	*Finished Size and Tolerance Thk.	X	W	X	L	Type of Material

PART B: Stock Materials/Supplies

Part #	No. of Pcs.	Stock/Sizes Thk. X W X L	Material/Supplies	Unit Quality	Cost Per Unit	Total

Total Value ____________________

Less No Charges ________________

TOTAL DUE ______________________

STUDENT'S PLAN SHEET

Student's Name________________________________ Class__________________

Name of Project________________Date Started____________Date Completed____________

Estimated Time__________________________Actual time______________________________

Personal efficiency: actual time ÷ estimated time = __________%

Source of drawing ____

MATERIALS REQUIRED

No. of pieces	Description and size of piece	Kind of materials	Unit Cost	Extended Cost

Tools:
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.

Order of Procedure:
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
14.

Approved______________________________

PROJECT PLANNING AND EVALUATION

(Place complete working drawing on reverse side.)

Grade____

Your name ____________________ Learner level ____________________

Project ____________________ Source of Idea ____________________

Date Begun__________ Date Finished__________ Cost__________

Total Time______________________________

Instructors approval____________________ Comments ____________________

PLANNING

MAIN OPERATIONS	TOOLS NEEDED
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.

(Continue on separate piece of paper if more room is needed.)

MATERIAL NEEDED

Part#	No. of Pieces	Size W	Size T	Size L	Material	Unit Cost	Total Cost

TOTAL____________________

PROJECT SELF EVALUATION FORM

NAME ______________________________ COMPLETION TIME ________________

PROJECT ______________________________ SCORE __________ GRADE __________

CODE 4-Excellent
3-Above average
2-Average
1-Below average

I. DESIGN
- A. Functional Requirements.
  - 1. Does project serve its intended purpose? 1 2 3 4
  - 2. Does project perform efficiently? 1 2 3 4
- B. Material Requirement.
  - 1. Does project reflect simple, direct, and practical uses of materials? 1 2 3 4
  - 2. Were materials used to their best? 1 2 3 4
  - 3. Was maximum use received from minimmm materials? 1 2 3 4
  - 4. Were characteristics of materials observed? 1 2 3 4
- C. Visual Requirements.
  - 1. Does it look right; is it interesting? 1 2 3 4
  - 2. Does it exhibit good proportion and balance? 1 2 3 4

II. PLANNING
- A. Is working sketch complete and orderly? 1 2 3 4
- B. Does plan of procedure follow a logical order? 1 2 3 4
- C. Is bill of materials complete? 1 2 3 4

III. CONSTRUCTION
- A. Were safety precautions observed? 1 2 3 4
- B. Were machines properly used? 1 2 3 4
- C. How well were mistakes corrected? 1 2 3 4
- D. Did I work accurately and carefully? 1 2 3 4
- E. Was skill exhibited in the use of:
  - 1. Layout and measuring? 1 2 3 4
  - 2. Cutting tools? 1 2 3 4
  - 3. Machining? 1 2 3 4
- F. To what extent did I keep profitably busy? 1 2 3 4
- G. Did I show initative and resourcefulness? 1 2 3 4

IV. COMPLETION
- A. Is project general appearance neat and orderly? 1 2 3 4
- B. Do joints properly fit?
- C. Do dimensions of project correspond with drawing? 1 2 3 4
- D. Were materials used to best advantage? (grain matched, best faces exposed, etc.) 1 2 3 4
- E. What quality is the finish? 1 2 3 4

UNDERSTANDING FRACTIONS

1. PARTS OF A FRACTION ARE: $\frac{3}{4}\ \frac{[\text{Numerator}]}{[\text{Denominator}]}$ [Divisor Line] (N÷D)

2. ALWAYS REDUCE TO LOWEST TERMS: $\frac{8}{16}=\frac{1}{2}$

(CALCULATING FRACTIONS)

A. ADDING: (1) $\frac{1}{4}+\frac{1}{4}=\frac{2}{4}=\frac{1}{2}$ (2) $\frac{1}{2}+\frac{3}{8}=\frac{4}{8}+\frac{3}{8}=\frac{7}{8}$

(3) $\frac{3}{4}+\frac{7}{8}=\frac{6}{8}+\frac{7}{8}=\frac{13}{8}$ $(13\div 8)=1\frac{5}{8}$

B. SUBTRACTING: (1) $\frac{3}{4}-\frac{1}{8}=\frac{6}{8}-\frac{1}{8}=\frac{5}{8}$ (2) $\frac{3}{16}-\frac{1}{16}=\frac{2}{16}=\frac{1}{8}$

(2) $3\frac{3}{8}-1\frac{3}{4}=3\frac{3}{8}-1\frac{6}{8}$ $\left(\frac{6}{8}\ \underline{\text{can't be subt. from}}\ \frac{3}{8}\right)$

$3\frac{3}{8}\left[2+\frac{8}{8}+\frac{3}{8}\right]=2\frac{11}{8}-1\frac{6}{8}=1\frac{5}{8}$

C. DIVIDING: (1) $\frac{3}{4}\div 2=\frac{3}{4}\times\frac{1}{2}=\frac{3}{8}$ (2) $\frac{7}{8}\div 2=\frac{7}{8}\times\frac{1}{2}=\frac{7}{16}$

D. MULTIPLYING: (1) $\frac{3}{4}\times 2=\frac{3}{4}\times\frac{2}{1}=\frac{3}{2}=1\frac{1}{2}$ (2) $\frac{1}{4}\times\frac{1}{8}=\frac{1}{32}$

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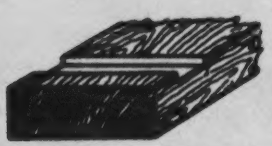
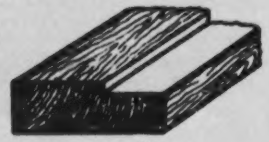
COMMON CUTS IN WOOD

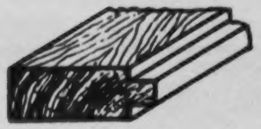
Plow



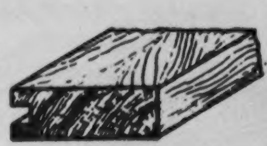
Dado



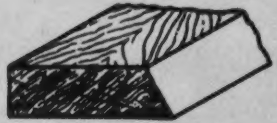
Rabbet



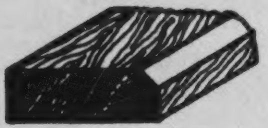
Tongue



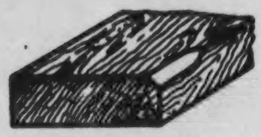
Groove



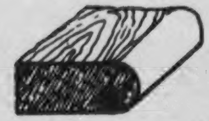
Bevel



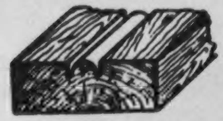
Chamfer



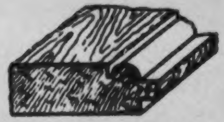
Stop Chamfer



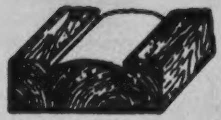
Nosing



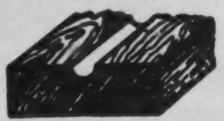
Center Bead



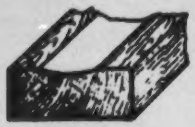
Edge Bead



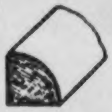
Round



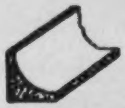
Flute



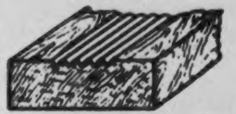
Hollow



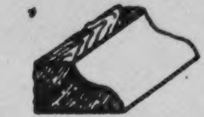
¼ Round



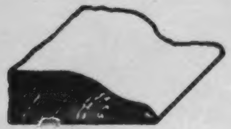
Cove or ¼ Hollow



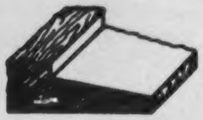
Reed



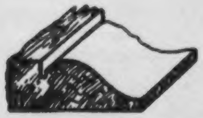
Reverse Ogee



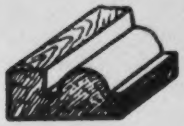
Roman Ogee



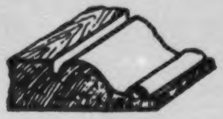
Ship Lap



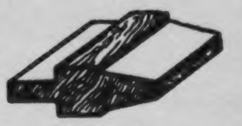
Common Ogee



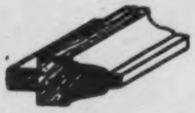
Astragal



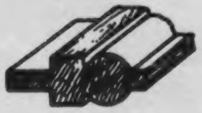
Grecian Ogee with Bead



Bevel Sash



Ogee Sash



Ovalo Sash

STANLEY TOOLS
New Britain, Conn., U.S.A.

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EDUCATIONAL DEPARTMENT
CHART NO. 4

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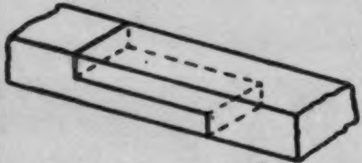
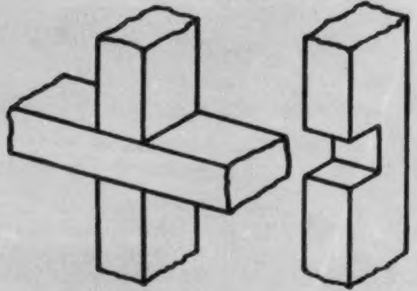
COMMON WOOD JOINTS

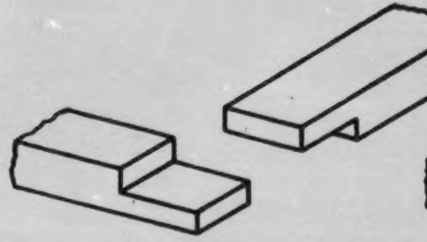
STANLEY



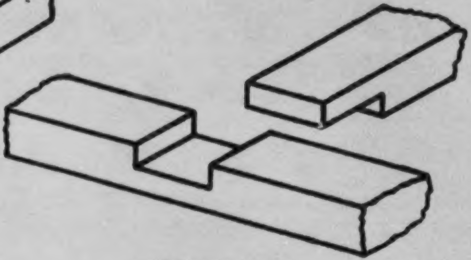
HALF LAP



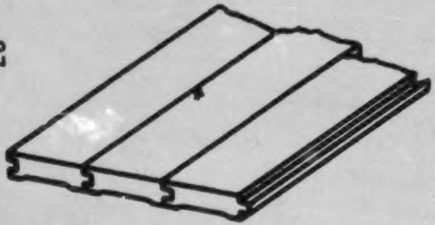
CROSS LAP



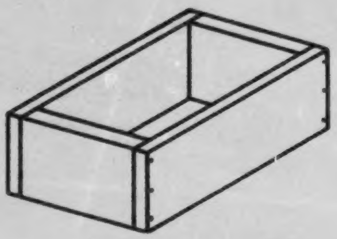
END LAP



MIDDLE LAP



TONGUE & GROOVE



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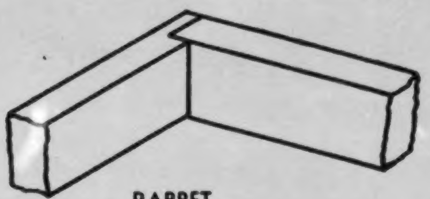
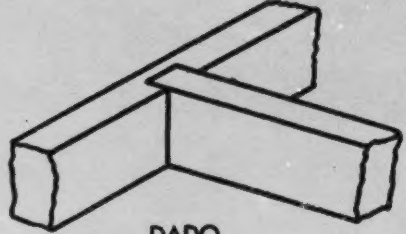
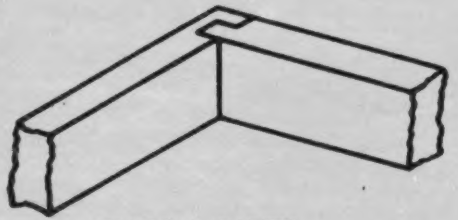


RABBET



DADO



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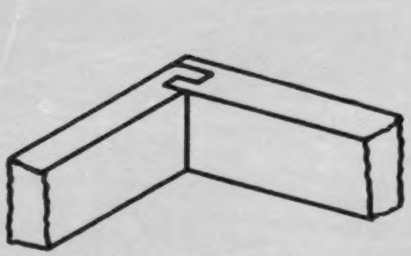
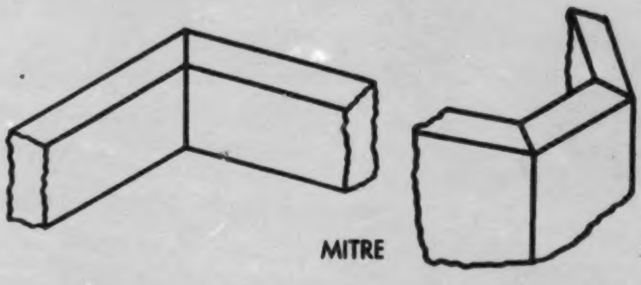


DADO TONGUE AND RABBET



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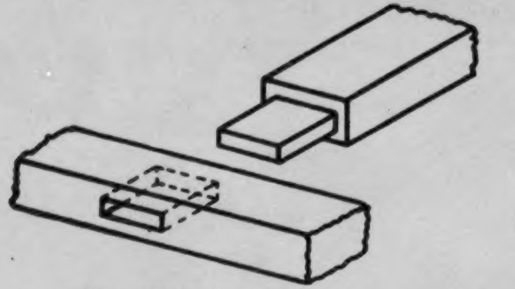
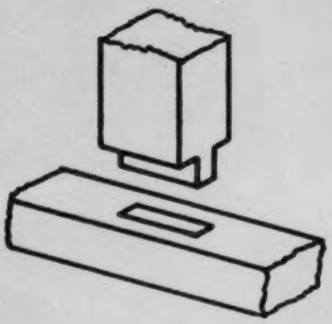
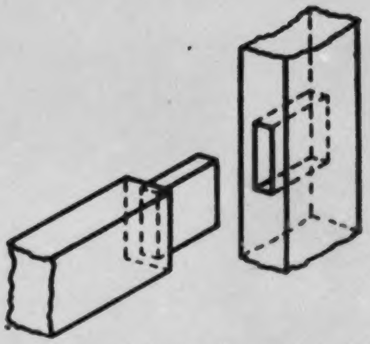
COMMON WOOD JOINTS



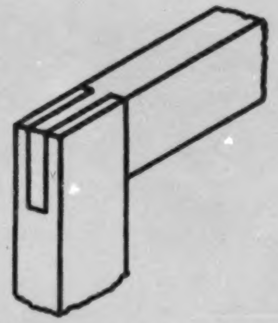
THRU MORTISE TENON



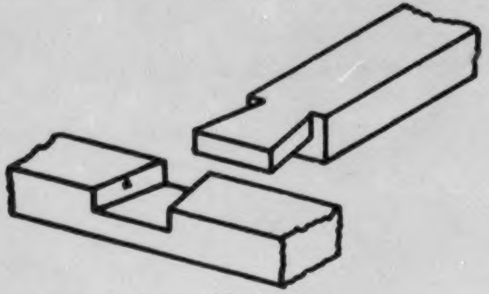
STUB MORTISE TENON



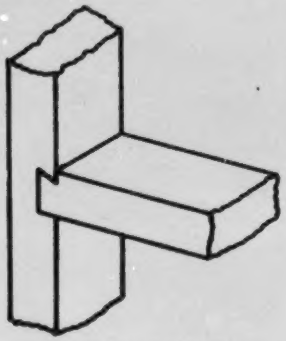
BLIND MORTISE TENON



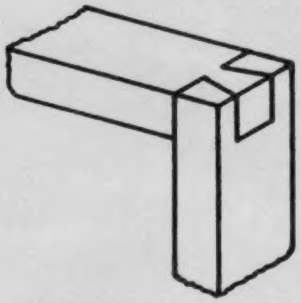
OPEN MORTISE TENON



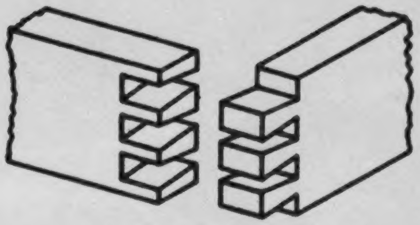
LAP DOVETAIL



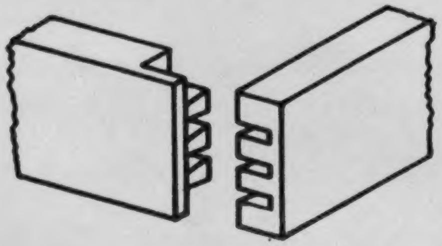
DOVETAIL DADO



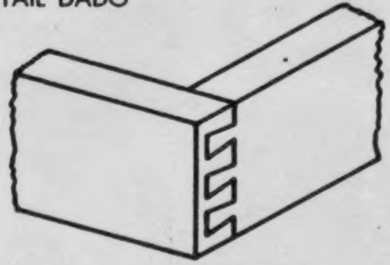
THRU SINGLE DOVETAIL



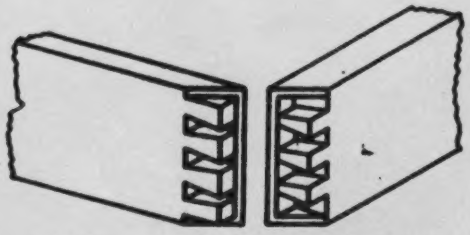
THRU MULTIPLE DOVETAIL



STOPPED LAP DOVETAIL



LAP DOVETAIL OR HALF
BLIND DOVETAIL



BLIND MITRE OR SECRET DOVETAIL

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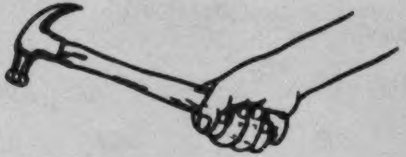
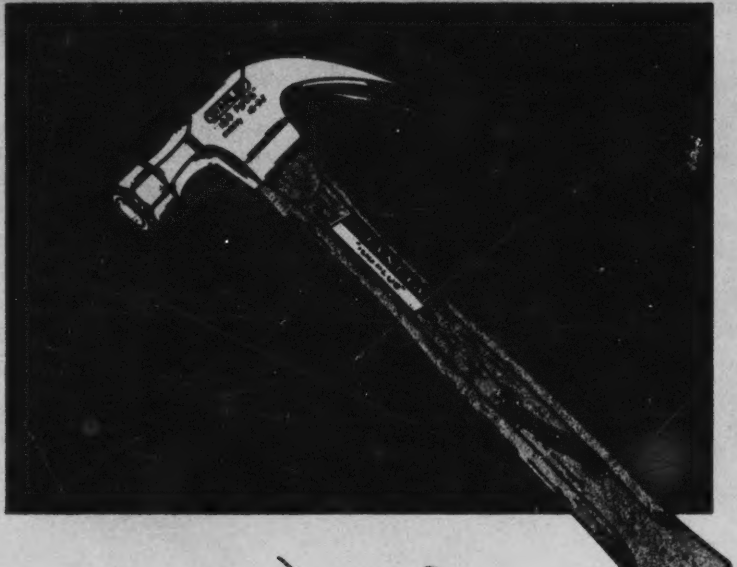
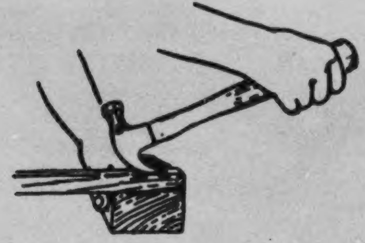
STANLEY STANLEY

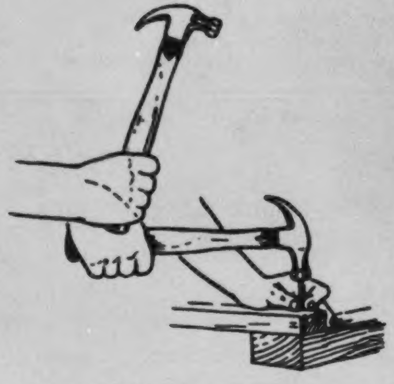


GRASP THE HAMMER FIRMLY NEAR THE END.

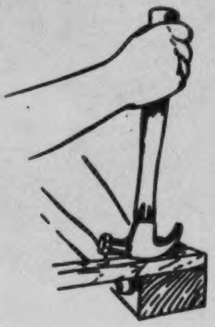




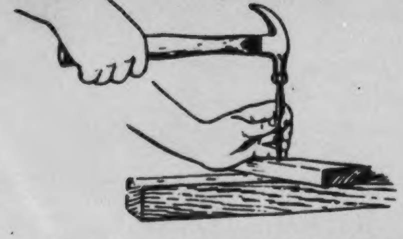
TO DRAW A NAIL SLIP THE CLAW OF THE HAMMER UNDER THE NAIL HEAD; PULL UNTIL THE HANDLE IS NEARLY VERTICAL AND THE NAIL PARTLY DRAWN.



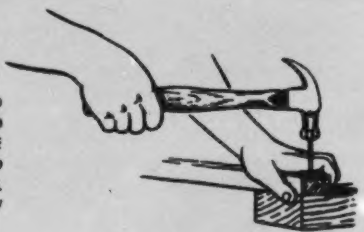
THE BLOW IS DELIVERED THROUGH THE WRIST, THE ELBOW AND THE SHOULDER, ONE OR ALL BEING BROUGHT INTO PLAY, ACCORDING TO THE STRENGTH OF THE BLOW TO BE STRUCK. REST THE FACE OF THE HAMMER ON THE NAIL, DRAW THE HAMMER BACK AND GIVE A LIGHT TAP TO START THE NAIL AND TO DETERMINE THE AIM.



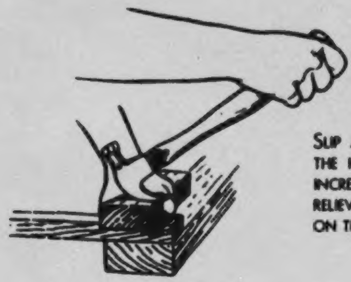
IF THE PULL IS CONTINUED, UNNECESSARY FORCE IS REQUIRED THAT WILL BEND THE NAIL, MAR THE WOOD AND PERHAPS BREAK THE HAMMER HANDLE.



USE A NAIL SET TO DRIVE NAILS BELOW THE SURFACE OF ALL FINE WORK. TO PREVENT THE NAIL SET SLIPPING OFF THE HEAD OF THE NAIL, REST THE LITTLE FINGER ON THE WORK AND PRESS THE NAIL SET FIRMLY AGAINST IT. SET NAILS ABOUT 1/16" BELOW THE SURFACE OF THE WOOD.



STRIKE THE NAIL SQUARELY TO AVOID MARRING THE WOOD AND BENDING THE NAIL. KEEP THE FACE OF THE HAMMER CLEAN TO AVOID SLIPPING OFF THE NAIL. IF A NAIL BENDS DRAW IT AND START A NEW ONE IN A NEW PLACE.



SLIP A PIECE OF WOOD UNDER THE HEAD OF THE HAMMER TO INCREASE THE LEVERAGE AND TO RELIEVE THE UNNECESSARY STRAIN ON THE HANDLE.

ALWAYS STRIKE WITH THE FACE OF THE HAMMER. IT IS HARDENED FOR THAT PURPOSE. DO NOT DAMAGE THE FACE BY STRIKING STEEL HARDER THAN ITSELF. DO NOT STRIKE WITH THE CHEEK AS IT IS THE WEAKEST PART.

A BELL FACE HAMMER IS SLIGHTLY MORE CONVEX THAN A PLAIN FACE HAMMER. WITH IT A NAIL CAN BE DRIVEN FLUSH, OR SLIGHTLY BELOW THE SURFACE OF THE WORK, WITHOUT LEAVING HAMMER MARKS IN THE WOOD.

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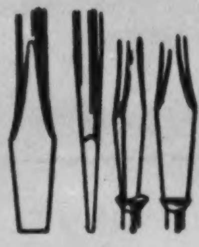
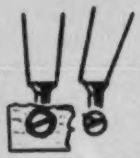
STANLEY

HOW TO USE
THE STANLEY SCREWDRIVER
AND INFORMATION FOR DRIVING SCREWS

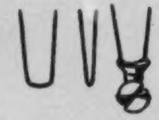
STANLEY



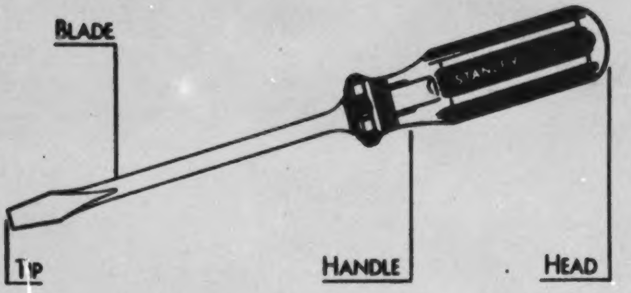
SELECT A SCREW DRIVER OF LENGTH AND TIP FITTED TO THE WORK.
SCREW DRIVERS ARE SPECIFIED BY THE LENGTH OF THE BLADE.
THE TIP SHOULD BE STRAIGHT AND NEARLY PARALLEL SIDED. IT SHOULD ALSO FIT THE SCREW SLOT AND BE NOT WIDER THAN THE SCREW HEAD.



IF THE TIP IS TOO WIDE IT WILL SCAR THE WOOD AROUND THE SCREW HEAD.
IF THE SCREW DRIVER IS NOT HELD IN LINE WITH THE SCREW IT WILL SLIP OUT OF THE SLOT AND MAR BOTH THE SCREW AND THE WORK.



IF THE TIP IS ROUNDED OR BEVELED IT WILL RAISE OUT OF THE SLOT SPOILING THE SCREW HEAD. REGRIND OR FILE THE TIP TO MAKE IT AS SHOWN ABOVE.



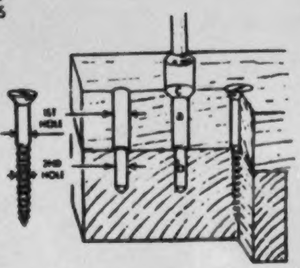
STANLEY SCREW DRIVER NO. 1006-6 IN. BLADE

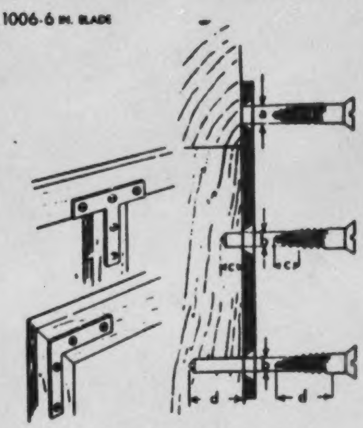
USE THE LONGEST SCREW DRIVER CONVENIENT FOR THE WORK. MORE POWER CAN BE APPLIED TO A LONG SCREW DRIVER THAN A SHORT ONE, WITH LESS DANGER OF IT'S SLIPPING OUT OF THE SLOT.
HOLD THE HANDLE FIRMLY IN THE PALM OF THE RIGHT HAND WITH THE THUMB AND FOREFINGER GRASPING THE HANDLE NEAR THE FERRULE. WITH THE LEFT HAND STEADY THE TIP AND KEEP IT PRESSED INTO THE SLOT WHILE RENEWING THE GRIP ON THE HANDLE FOR A NEW TURN.

IF NO HOLE IS BORED FOR THE THREADED PART OF THE SCREW THE WOOD IS OFTEN SPLIT OR THE SCREW IS TWISTED OFF. IF A SCREW TURNS TOO HARD, BACK IT OUT AND ENLARGE THE HOLE.
A LITTLE SOAP ON THE THREADS OF THE SCREW MAKES IT EASIER TO DRIVE.

TO FASTEN TWO PIECES OF WOOD TOGETHER WITH SCREWS:

1. LOCATE THE POSITIONS OF THE SCREW HOLES.
2. BORE THE FIRST HOLE SLIGHTLY SMALLER THAN THE THREADED PART OF THE SCREW THROUGH BOTH PIECES OF WOOD AS AT b. BORE ONLY AS DEEP AS THREE QUARTERS THE LENGTH OF THE SCREW.
3. BORE THE SECOND HOLE IN THE FIRST PIECE OF WOOD SLIGHTLY LARGER THAN THE DIAMETER OF THE SCREW SHANK, AS AT a.
4. COUNTERSINK THE FIRST HOLES TO MATCH THE DIAMETER OF THE HEADS OF THE SCREWS, AS AT c.
5. DRIVE THE SCREWS TIGHTLY IN PLACE WITH THE SCREW DRIVERS.

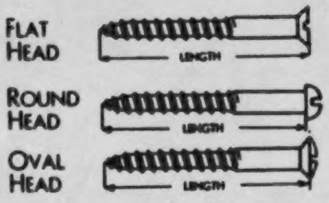




TO FASTEN HINGES OR OTHER HARDWARE IN PLACE WITH SCREWS:

1. LOCATE THE POSITION OF THE PIECE OF HARDWARE ON THE WORK.
2. RECESS THE WORK TO RECEIVE THE HARDWARE, IF IT IS NECESSARY.
3. LOCATE THE POSITIONS OF THE SCREWS.
4. SELECT SCREWS THAT WILL EASILY PASS THRU THE HOLES IN THE HARDWARE, AS AT a.
5. BORE THE PILOT HOLES (SECOND HOLE) SLIGHTLY SMALLER THAN THE DIAMETER OF THE THREADED PART OF THE SCREWS, AS AT b.
6. DRIVE THE SCREWS TIGHTLY IN PLACE.

IF THE WOOD IS SOFT, BORE AS DEEP AS HALF THE LENGTH OF THE THREADED PART OF THE SCREW, AS AT c. IF THE WOOD IS HARD, (OAK), THE SCREW SOFT (BRASS), OR IF THE SCREW IS LARGE, THE HOLE MUST BE NEARLY AS DEEP AS THE SCREW, AS AT d. HOLES FOR SMALL SCREWS ARE USUALLY MADE WITH BRAD AWLS.

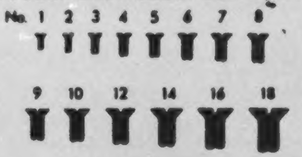


SIZES OF BITS OR DRILLS TO BORE HOLES FOR WOOD SCREWS

NUMBER OF SCREW		1	2	3	4	5	6	7	8	9	10	12	14	16	18
BODY DIAMETER OF SCREW		.073	.086	.099	.112	.125	.138	.151	.164	.177	.190	.216	.242	.268	.294
		5/64-	3/32-	3/32+	7/64+	1/8	9/64-	5/32-	11/64-	11/64+	3/16+	7/32-	15/64+	17/64+	19/64-
FIRST HOLE	TWIST DRILL SIZE	5/64	3/32	7/64	7/64	1/8	9/64	5/32	11/64	3/16	3/16	7/32	1/4	17/64	19/64
	AUGER BIT NUMBER							3	3	3	3	4	4	5	5
SECOND HOLE	TWIST DRILL SIZE		1/16	1/16	5/64	5/64	3/32	7/64	7/64	1/8	1/8	9/64	5/32	3/16	13/64
	AUGER BIT NUMBER												3	3	4

EXACT SIZES CANNOT BE GIVEN FOR THE HOLES FOR WOOD SCREWS. THE ABOVE ARE APPROXIMATELY RIGHT FOR AVERAGE NEEDS. VARIATIONS IN HARD AND SOFT WOOD, MOISTURE CONTENT AND SNUG OR LOOSE FITS, IF DESIRED, SHOULD BE CONSIDERED. NUMBER AND LETTER SIZES OF DRILLS ARE AVAILABLE, IF MORE EXACT SIZES ARE WANTED. A TRIAL FIT IN SCRAP WOOD IS PRACTICAL.

DETERMINE SCREW SHANK SIZES BY COMPARISON BELOW



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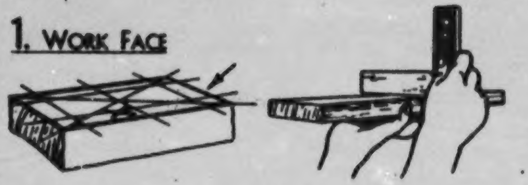
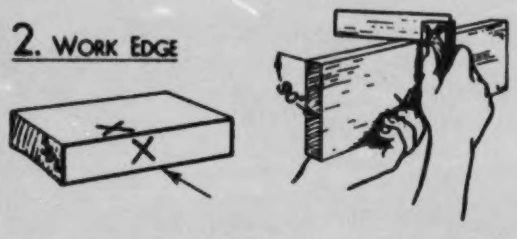
1. Work Face



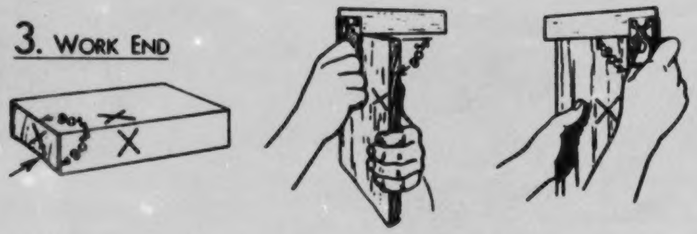
Plane one broad surface smooth and straight. Test it crosswise, lengthwise, and from corner to corner. Mark the Work Face X.

2. Work Edge



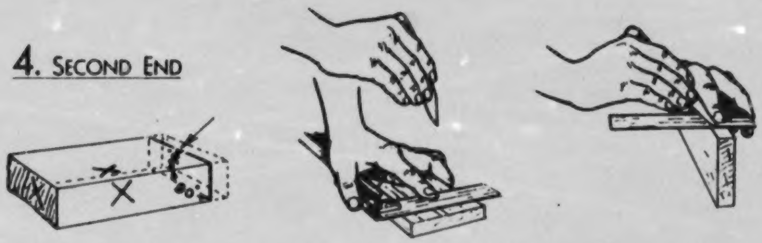
Plane one edge smooth, straight and square to the work face. Test it from the Work Face. Mark the Work Edge X.

3. Work End



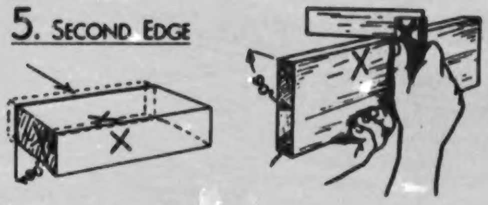
Plane one end smooth and square. Test it from the Work Face and Work Edge. Mark the Work End X.

4. Second End



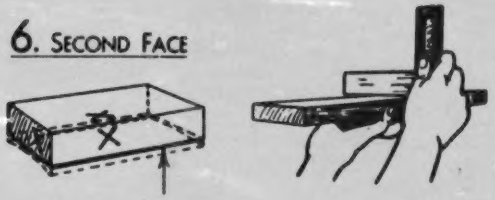
Measure length and scribe around the stock, a line square to the Work Edge and Work Face. Saw off excess stock near the line and plane smooth to the scribed line. Test the Second End from both the Work Face and the Work Edge.

5. Second Edge

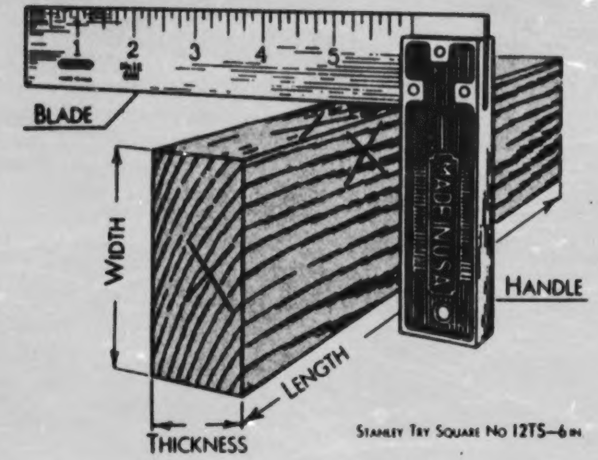


From the Work Edge gauge a line for width on both faces. Plane smooth, straight, square and to the gauge line. Test the second Edge from the Work Face.

6. Second Face



From the Work Face gauge a line for thickness around the stock. Plane the stock to the gauge line. Test the Second Face as the Work Face is tested.



Stanley Try Square No 12TS—6 in

Hold the handle of the Try Square tight against the stock when testing ends, edges or scribing lines. For the use of the Marking Gauge see Stanley Chart No C8. For the use of the Plane see Stanley Chart No C14.

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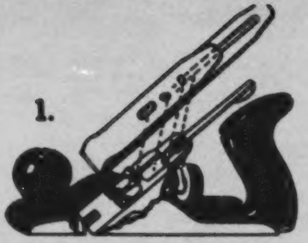
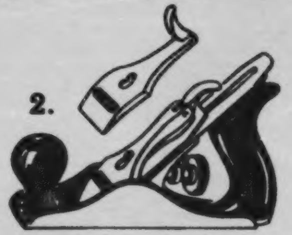
1.



To put the Plane together lay the Plane Iron, bevel side down, on the Frog. Be sure the Roller on the Lateral Adjusting Lever, the end of the "Y" Adjusting Lever and the head of the Plane Iron Cap Screw are correctly seated.

2.



Slip the Lever Cap under the Lever Cap Screw and press down the Cam. If the Plane Iron is in the correct position the Cam will easily snap in place. If the Cam will will not snap in place easily, slightly loosen the Lever Cap Screw.

If the Plane Iron, is not firmly held when the Cam is in place slightly tighten the Lever Cap Screw.

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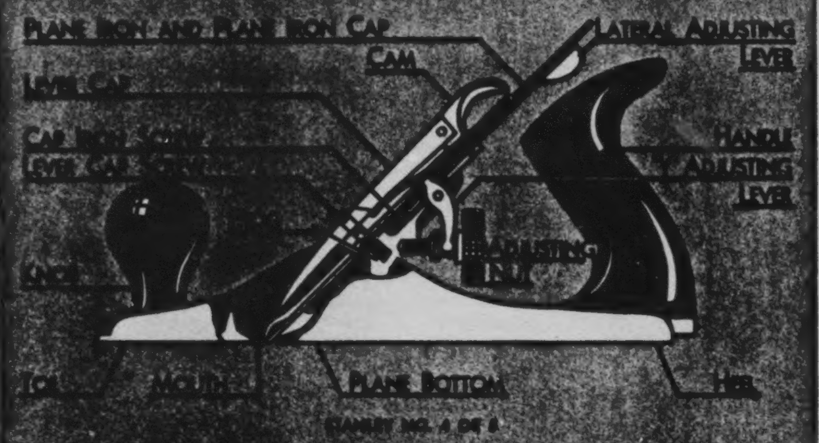
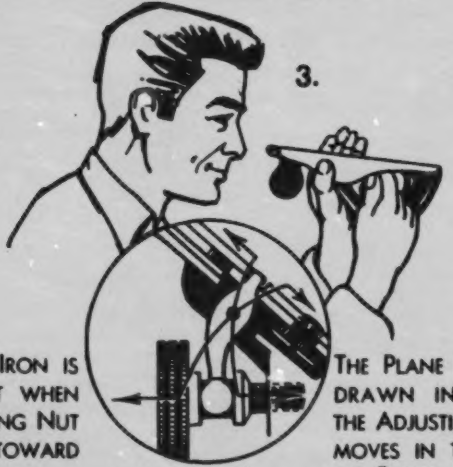


To adjust for the thickness of the shaving sight along the bottom of the plane and turn the Adjusting Nut until the cutting edge projects about the thickness of a hair.

3.

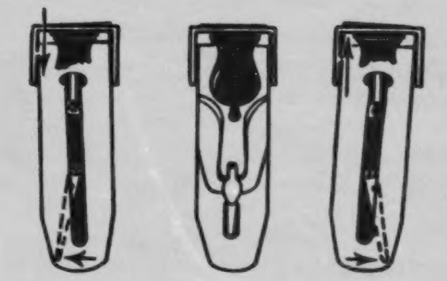


The Plane Iron is pushed out when the Adjusting Nut moves out toward the handle.

The Plane Iron is drawn in when the Adjusting Nut moves in toward the Frog.

4.

To adjust for the evenness of the shaving sight along the bottom of the Plane and move the Lateral Adjusting Lever toward the right or the left.



Knob, Lever Cap and Plane Iron Cap removed to show the action of the Lateral Adjusting Lever.

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APPENDIX B

Most of the diagrams, sample tests, guides and forms in this section were adopted from the Safety Guide. . .Administrator and Instructor Section, published by the Industrial Arts section of the Washington State Department of Education, and the Safety Guide Second Edition, published by the Industrial Arts section of the Pennsylvania Department of Education.

Both of these publications are excellent sources of information and sincere thanks are extended to these two agencies for their permission to reproduce these materials.

PARENTAL PERMISSION AND ACKNOWLEDGEMENT

Parental acknowledgement of the student's activities and an awareness of the teacher's interest in the safety of the child is important. The teacher should express this interest at every opportunity.

At the beginning of each Industrial Arts course a "permission slip" should be sent home with the student for the parent's signature.

Do not misunderstand the main purpose of a "permission slip." For years, Industrial Arts teachers have used "permission slips," which were sent home and signed by the parents permitting their child to participate in the shop program. Many teachers believed that this "permission slip" relieved them of some or all of their responsibility and liability should an accident occur. IT DOES NEITHER OF THESE. The purpose of this type of communication is to:

1. Inform the parent of his/her child's participation in Industrial Arts type of activities.
2. Outline the safety instruction and procedures that are followed by the teacher and the parish.
3. Obtain from the parents relevant information regarding any health problems that may have a bearing on their child's performance.
4. List the name of the parents and telephone number(s) where they can be reached during school hours, and list the name of their family doctor.

NOTE: A card file on every student should be maintained in each Industrial Arts Laboratory.

An illustration of what this communication to the parents might look like is included on the following page.

SAMPLE SAFETY AGREEMENT

I agree to follow only those practices and procedures that are identified by the instructor as being safe. Furthermore, I agree not to use any machine in the lab until the instructor's approval is obtained. I also understand that no machine or portable electric tool is to be used unless the teacher is present.

At no time will I either distract or bother other students (or enter a machine operator's area) while a machine is being used. I further agree not to remove any guard without special permission from the instructor. In return, the instructor is expected to provide as far as possible a safe working place.

Signed ______________________________

Date ______________________________

PERMISSION SLIP
THE STUDENT AND SAFETY IN INDUSTRIAL ARTS

Louisiana Public School
Department of Industrial Arts

School ______________________________ Teacher ______________________________

TO: ______________________________

______________________________ is enrolled in our Industrial Arts
(Name of Student)

program and will have the opportunity to use various tools and equipment. Appropriate instruction in the safe operation of these tools and equipment is given and close supervision in maintained at all times. Although every precaution is taken to prevent accidents, a certain risk is involved due to the nature of the experience, the age of the student, and the learning environment.

We are asking your cooperation in impressing upon your child the importance of being careful. This, we believe, will back up the instruction that is given in school.

We welcome your visit to our school and the Industrial Arts Department to see our program. These visits can be arranged by calling ________________.

Thank you very much for your help and assistance in providing your child with the "real world" experience of Industrial Arts in a safe working environment.

. . . . To Be Completed By The Parent: . . . .

I have read the attached communication and I understand the type of program that ________________ is enrolled in. I will stress the safety
(Student's name)

aspects of the program to my child. I encourage my child to participate fully in this Industrial Arts program.

______________________________ ______________________________
(Signature of Parent or Guardian) (Date)

Phone (Home) ______________________________ (Work) ______________________________

Health problems that may have a bearing on my child's participation in this class are: ______________________________

____

. . . . To Be Completed By The Student: . . . .

I agree to observe all safety rules and procedures for safe operation and conduct in the school Industrial Arts shop and will wear approved eye protection at all times.

______________________________ ______________________________
Signature of Student Date

HAZARDOUS CONDITIONS REPORT

This is a suggested method for reporting the hazard and directing action to see that the hazard is corrected or removed.

If a hazard exists, the operation should be "red tagged" and shut down until corrected. NOTE: This form can be used to report a student who is a hazard as well as a hazardous condition in the laboratory.

HAZARDOUS CONDITIONS FORM

Date____________________

TO:____
Principal School

Description and Location of Health or Safety Hazard:____________________

____

____

Suggested Solution:________________________________

____

____

Teacher Signature:____________________

Distribution: Original - Principal
1st Copy - Department Head
2nd Copy - Teacher Reporting Hazard
3rd Copy - Parish Safety Officer (Vocational Supervisor)

Action Taken:____________________________________

____

____

By Whom:____________________________
Signature

STUDENT ACCIDENT INVESTIGATION REPORT

Class ______________________ Period __________ Room ______________

Instructors's Name ____

Name of Injured ____________________ Date & Time __________________

Exact Location of Accident ____

Description of Accident* ____

____

Indicate below with an "X" whether in your opinion accident was caused by one of the following:

PHYSICAL CAUSES

( ) Improper protection (personal or equipment)
( ) Defective tools or equipment
( ) Hazardous arrangement
( ) Improper illumination
( ) Poor housekeeping
( ) Not listed - describe briefly*

____

____

PERSONAL CAUSES

( ) Physical or mental defect
( ) Lack of knowledge or skill
( ) Wrong attitude
( ) Use of intoxicants or drugs
( ) Not listed - describe briefly*

____

____

UNSAFE ACTS

( ) Working without authority
( ) Failure to secure or warn
( ) Working at unsafe speed
( ) Made safety device inoperative
( ) Used unsafe equipment or hands instead of equipment
( ) Not listed - describe briefly*

( ) Unsafe material handling
( ) Took unsafe position
( ) Worked on moving equipment
( ) Horseplay
( ) Did not use safe clothes or personal protective equipment

____

____

NOTE: Make certain of names and descriptions of witnesses, injured sent to hospital, condition of injured, assistance by others, etc.

Actions taken to prevent a similar future accident* ________________

____

Date of Report __________________ Signature _______________________

*USE OTHER SIDE OF SHEET IF NECESSARY.

INDUSTRIAL ARTS DEPARTMENT

Student Accident Report

TO BE COMPLETED BY INSTRUCTOR

Student's Name ______________________________ Grade ______________

Location of Accident ____

Time ________ A.M./ __________ P.M.

Date of Accident ______________________________

Description of Injury ____

____

Location of Instructor when Accident Occurred: ______________________

Description of How Accident Happened: ______________________________

____

Indicate Equipment, Machinery, or Tools Involved: ____________________

____

Describe unsafe practices, if any, contributing to accident: ______________

____

Suggestions for prevention of similar accident: ______________________

____

Witnesses to Accident: 1. ______________________________________

2. ______________________________________

Instructor's Signature ______________________________ Date ______________

Student's Signature ______________________________ Date ______________

NOTE: One copy to be filed with Department Chairman.

EMERGENCY TELEPHONE NUMBERS*

*Post by Phone

	NAME	TELEPHONE
Ambulance		
Fire Department		
Hospital (nearest)		
Doctor (nearest)		
Main Office		
School Nurse		
Medic I		
Poison Control Center		

EMERGENCY COMMUNICATIONS

Procedures established for emergency situations and accidents must contain the approved method of "who tells what to whom and when." To facilitate this communication, each Industrial Arts department should have a telephone with a direct outside line (for ambulance, fire, and police emergencies). In addition:

1. All students should know the location of the telephone and be familiar with the emergency procedures and numbers.

2. All personnel in the laboratory should have access to the telephone for emergency communications. (The telephone should not be locked in the teacher's office.)

3. Emergency procedures and police, ambulance and fire department numbers and the procedure for dialing an "outside" line should be posted at each telephone location.

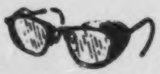
Selection Chart

Recommended Eye and Face Protectors for Use in Industry, Schools, and Colleges

1

2

3


4

5

6

7

8

9

10

11

1. **GOGGLES**, Flexible Fitting, Regular Ventilation
2. **GOGGLES**, Flexible Fitting, Hooded Ventilation
3. **GOGGLES**, Cushioned Fitting, Rigid Body

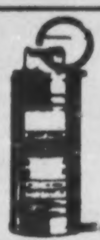
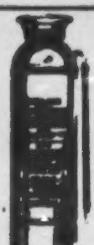
*4. **SPECTACLES**, Metal Frame, with Sideshields
*5. **SPECTACLES**, Plastic Frame, with Sideshields
*6. **SPECTACLES**, Metal-Plastic Frame, with Sideshields
** 7. **WELDING GOGGLES**, Eyecup Type, Tinted Lenses (Illustrated)
7A. **CHIPPING GOGGLES**, Eyecup Type, Clear Safety Lenses (Not Illustrated)
** 8. **WELDING GOGGLES**, Coverspec Type Tinted Lenses (Illustrated)
8A. **CHIPPING GOGGLES**, Coverspec Type, Clear Safety Lenses (Not Illustrated)
** 9. **WELDING GOGGLES**, Coverspec Type, Tinted Plate Lens
10. **FACE SHIELD** (Available with Plastic or Mesh Window)
11. **WELDING HELMETS

*Non-sideshield spectacles are available for limited hazard use requiring only frontal protection.
**See appendix chart "Selection of Shade Numbers for Welding Filters."

APPLICATIONS		
OPERATION	HAZARDS	RECOMMENDED PROTECTORS: Bold Type Numbers Signify Preferred Protection
ACETYLENE—BURNING ACETYLENE—CUTTING ACETYLENE—WELDING	SPARKS, HARMFUL RAYS, MOLTEN METAL, FLYING PARTICLES	7, 8, 9
CHEMICAL HANDLING	SPLASH, ACID BURNS, FUMES	2, 10 (For severe exposure add 10 over 2)
CHIPPING	FLYING PARTICLES	1, 3, 4, 5, 6, 7A, 8A
ELECTRIC (ARC) WELDING	SPARKS, INTENSE RAYS, MOLTEN METAL	9, 11 (11 in combination with 4, 5, 6, in tinted lenses, advisable)
FURNACE OPERATIONS	GLARE, HEAT, MOLTEN METAL	7, 8, 9 (For severe exposure add 10)
GRINDING—LIGHT	FLYING PARTICLES	1, 3, 4, 5, 6, 10
GRINDING—HEAVY	FLYING PARTICLES	1, 3, 7A, 8A (For severe exposure add 10)
LABORATORY	CHEMICAL SPLASH, GLASS BREAKAGE	2 (10 when in combination with 4, 5, 6)
MACHINING	FLYING PARTICLES	1, 3, 4, 5, 6, 10
MOLTEN METALS	HEAT, GLARE, SPARKS, SPLASH	7, 8 (10 in combination with 4, 5, 6, in tinted lenses)
SPOT WELDING	FLYING PARTICLES, SPARKS	1, 3, 4, 5, 6, 10

KNOW YOUR FIRE EXTINGUISHERS

DEPARTMENT OF LABOR
UNITED STATES OF AMERICA

	WATER TYPE				FOAM	CARBON DIOXIDE	DRY CHEMICAL			
							SODIUM OR POTASSIUM BICARBONATE		MULTI-PURPOSE ABC	
	STORED PRESSURE	CARTRIDGE OPERATED	 WATER PUMP TANK	 SODA ACID	FOAM	CO 2	CARTRIDGE OPERATED	STORED PRESSURE	STORED PRESSURE	CARTRIDGE OPERATED
CLASS A FIRES ORDINARY COMBUSTIBLES WOOD, PAPER, TRASH HAVING GLOWING EMBERS	YES	OBSOLETE UPDATE YOUR FIRE EXTINGUISHING CAPABILITY— ASK FOR "TRADE-IN UPDATE" PRICE	YES	OBSOLETE UPDATE YOUR FIRE EXTINGUISHING CAPABILITY— ASK FOR "TRADE-IN UPDATE" PRICE	OBSOLETE UPDATE YOUR FIRE EXTINGUISHING CAPABILITY— ASK FOR "TRADE-IN UPDATE" PRICE	NO (BUT WILL CONTROL SMALL SURFACE FIRES)	NO (BUT WILL CONTROL SMALL SURFACE FIRES)	NO (BUT WILL CONTROL SMALL SURFACE FIRES)	YES	YES
CLASS B FIRES FLAMMABLE LIQUIDS FLAMMABLE LIQUIDS, GASOLINE, OIL, PAINTS, GREASE, ETC.	NO		NO			YES	YES	YES	YES	YES
CLASS C FIRES ELECTRICAL EQUIPMENT ELECTRICAL EQUIPMENT	NO		NO			YES	YES	YES	YES	YES
CLASS D FIRES COMBUSTIBLE METALS COMBUSTIBLE METALS	SPECIAL EXTINGUISHING AGENTS APPROVED BY RECOGNIZED TESTING LABORATORIES									
METHOD OF OPERATION	PULL PIN-SQUEEZE HANDLE	OBSOLETE UPDATE YOUR FIRE EXTINGUISHING CAPABILITY— ASK FOR "TRADE-IN UPDATE" PRICE	PUMP HANDLE	OBSOLETE UPDATE YOUR FIRE EXTINGUISHING CAPABILITY— ASK FOR "TRADE-IN UPDATE" PRICE	OBSOLETE UPDATE YOUR FIRE EXTINGUISHING CAPABILITY— ASK FOR "TRADE-IN UPDATE" PRICE	PULL PIN-SQUEEZE LEVER	RUPTURE CARTRIDGE-SQUEEZE LEVER	PULL PIN-SQUEEZE HANDLE	PULL PIN-SQUEEZE HANDLE	RUPTURE CARTRIDGE-SQUEEZE LEVER
RANGE	30' - 40'		30' - 40'			3' - 8'	5' - 20'	5' - 20'	5' - 20'	5' - 20'
MAINTENANCE	CHECK AIR PRESSURE GAUGE MONTHLY		DISCHARGE AND FILL WITH WATER ANNUALLY			WEIGH SEMI-ANNUALLY	WEIGH GAS CARTRIDGE-CHECK CONDITION OF DRY CHEMICAL ANNUALLY	CHECK PRESSURE GAUGE AND CONDITION OF DRY CHEMICAL ANNUALLY	CHECK PRESSURE GAUGE AND CONDITION OF DRY CHEMICAL ANNUALLY	WEIGH GAS CARTRIDGE-CHECK CONDITION OF DRY CHEMICAL ANNUALLY

NOTES:

Class D Fires - In hot metal areas which may utilize magnesium, titanium, zirconium & sodium must provide Type D extinguishers or D rated dry chemical available for use on metal fires.

It is important that the correct extinguisher is used on the proper class of fire.

HAND TOOL SAFETY

When improperly used, even a safe tool can cause accidents. Do not assume that all students know how to identify and/or use ordinary hand tools. They should be trained to choose the proper tool for each job and to use it only for its intended purpose.

All necessary tools should be available so the student does not have to improvise. Accidents occur more often when one tool is substituted for another. Remember, it is also important to use the correct size and type of tool such as a hammer, wrench, or screwdriver.

Three major causes of hand tool accidents are:

1. Using the wrong tool for the wrong job.
2. Using the proper tool incorrectly.
3. Using a damaged or defective tool as the result of poor inspection and maintenance practices.

SAFETY RULES FOR HAND TOOLS

1. Wear adequate eye protection devices at all times in the laboratory.
2. Select the proper size and type of tool for the job. Learn and follow the correct procedure for using each tool.
3. Cutting tools must be properly sharpened and in good condition.
4. Keep your hands free of oil and grease.
5. Handle sharp-edged and pointed tools with care; carry in such a way as to protect yourself and others.
6. Secure small or short work with a vise or clamp.
7. Never carry tools in your pockets.
8. Use tools only for the purpose for which they were intended.
9. Do not use tools with loose or cracked handles.
10. Keep punches and chisels in good condition. Mushroomed heads may chip and cause injuries.
11. Use a file only when it is equipped with a handle.
12. Never pry, hammer on, or hammer with a file; it may shatter.
13. Do not use screw drivers as chisels or pry bars.

14. The use of a "cheater" or any other means for increased leverage is hazardous. All wrenches are designed to a specific size-length-strength ratio.

15. Do not use a hard hammer on another hardened surface.

16. When finished with a tool, clean it and return it to the proper storage place.

17. Report any breakage or malfunctions to your instructor.

HOUSEKEEPING PRACTICES

1. Provide for the daily removal of all sawdust, shavings, metal cuttings and other waste material.
2. Provide properly marked boxes or bins for various kinds of scrap stock.
3. Utilize sturdy racks and bins for materials storage, arranged to keep material from falling on students and to avoid injuries from protruding objects.
4. Employ a standard procedure to keep floors free of oil, water and foreign material.
5. Provide brushes for the cleaning of equipment after each use.
6. Provide regular custodial service in addition to the end of class cleanup.
7. Prohibit the use of compressed air to clean clothing, equipment and work areas.
8. Keep walkways and work areas free of all obstructions.
9. Floor surfaces must be maintained in a "non skid" condition.
10. Utilize a student personnel organization to insure total involvement in housekeeping and a more thorough cleanup.

HOUSEKEEPING

Good housekeeping is a key item in accident prevention. It takes the cooperation of all; it can't be the responsibility of the instructor and custodian alone. An effective housekeeping program will:

1. Reduce exposures to slips and falls
2. Reduce fire hazards
3. Remind individuals of their responsibilities in keeping the laboratory clean and orderly, and

4. Organize the housekeeping effort so that everyone assumes their fair share of the task.

Good housekeeping cannot be accomplished by an occasional grand cleanup. A program must be developed for continual cleanup. The following are essential in a good housekeeping program:

1. The equipment is arranged to permit safe and efficient work practices.
2. Materials and supplies are neatly and safely stacked.
3. Sufficient waste containers are provided and used.
4. Floors are clean.
5. Combustible materials are properly disposed of or stored in approved containers.
6. Excess materials and debris are not allowed to remain on benches and in the work areas.
7. Regular inspections are made to maintain clean and orderly conditions.

Items that are necessary for good housekeeping in an industrial Arts laboratory are:

1. Adequate dust collecting system.
2. Suitable containers for scraps, shavings, chips and other waste material.
3. Adequate storage rooms, shelves, racks, and cabinets for materials and supplies.
4. Splash guards and collecting pans for all machines using oil and coolants.
5. Brooms, bench brushes, shop towels, and other cleaning equipment.

It is your responsibility to see that housekeeping tools, equipment, and supplies are properly used.

MATERIALS HANDLING

According to the National Safety Council, nearly one in four disabling injuries is directly related to materials handling activities. These accidents include such things as slips and falls while carrying objects, back injuries and hernias from improper lifting practices, chemical and heat burns from failure to use protective clothing or equipment, and mashed or amputated fingers or toes from dropped objects.

Some of the things you can do to reduce the chance of injury to yourself or others when handling materials are:

1. Use the proper aids to handle the materials, such as tongs for hot materials, block and tackle or jacks to lift extra heavy items, and blocks or wedges to keep items from rolling.
2. Don't try to lift heavy objects without help; before you lift make clear who is giving the orders.
3. Use proper lifting techniques.
4. If the material is heavy or sharp use gloves or pads to assure a better grip or to avoid cuts. Be careful of splinters when handling lumber; wear gloves to handle rough lumber.
5. Before you pick up an object be sure that the path you intend to follow is clear.
6. With heavy objects, make a "first lift" before carrying it so that you can get the feel and position.
7. With long objects, such as pipe or ladders, have someone at each end so that they can be safely guided.
8. Be careful not to drop or set heavy objects on your feet or those of other people.
9. Stack materials so that there is no danger of slipping or falling during storage or removal.

ELECTRICAL SAFETY

The use of electricity has become so common that few people realize the potential dangers of electrical energy. Most of the accidents that are caused by electricity could have been avoided if the hazard had been recognized and if action had been taken to correct the adverse condition.

The instructor must realize that any electrical circuit is a potential hazard, regardless of the amount of voltage or current present.

The nature of the injury may be affected by the frequency of the current and the kind of electrical energy. Direct current is usually considered less hazardous than alternating current as far as shock is concerned, but is more likely to produce severe burns and tissue damage. The physical condition of the victim is another factor which has a bearing on the severity of electrical shock.

Electrical accidents are caused by unsafe conditions, unsafe practices, or a combination of both.

A study of accidents in the State of California reveals that "unsafe practices were reported in four out of five accidents. Using unsafe or defective tools or equipment led the list, while failure to de-energize equipment, using tools or equipment in an unsafe manner and working in hazardous places were next in order."

Causes of electrical accidents can be traced to (1) defective equipment, (2) unsafe work practices, and (3) lack of knowledge of the dangers of electricity.

1. Defective Equipment. Types of Equipment frequently involved in electrical accidents include motor - driven equipment, control devices, portable electric tools, switches, panels, cutouts, conductors, plugs and fuses, and electric extension cords. A variety of unsafe conditions involving the different types of equipment creates many electrical hazards. Some of the common defects of tools and equipment are listed as follows:

    a. Improperly grounded equipment (ground wires missing, broken, or improperly connected);

    b. Open conduits, switch boxes, damaged or worn connections, and exposed live wires;

    c. Insulation which is defective, inadequate, worn frayed, wet, oily or deteriorated, creating short circuit possibilities and energizing equipment frames;

    d. Defective switches, receptacles, extension cords, and lamp sockets;

    e. Dirty motor windings, improperly adjusted brushes, and worn commutators;

    f. Improperly connected power tools and defective insulation in portable tools;

    g. Broken housings, loose or vibrating machine parts which might contact and energize tool or machine frames and expose "live" surfaces to operator.

2. Unsafe Practices. Unsafe practices and work procedures result in electrical accidents and fires. Some of the common unsafe acts committed in the shop are:

    a. Using ungrounded equipment and portable tools (except double insulated tools) or removing ground connections;

    b. Using defective tools or equipment in need of repair;

c. Using equipment that does not meet the approval of the Underwriters Laboratories for the intended use;

d. Unsafe cleaning of electrical panels, switch boxes, motors, and other electrical equipment with water or dangerous solvents;

e. Overloading of circuits or overfusing circuits by the use of wrong size or type of fuse;

f. Failure to use explosion-proof or other special wiring methods in hazardous locations.

g. Failure to positively lock out or otherwise de-energize and tag equipment or circuits to be worked on. Do not rely on gloves, rubber mats, etc., for electrical installation and repair.

h. Installation or extension of electrical facilities in a manner not meeting the National Electrical Code;

i. Repetitive closing of switches or circuit breakers when there is a fault on the circuit;

j. Using light duty, ungrounded extension cords for industrial service;

k. Failure to maintain clear access to electrical panels. Clearance of 30 inches is required by the Federal Code.

l. Use of extension cords in place of permanent wiring extensions;

m. Work practices that overload motors, insulation, wires or electrical accessories;

n. Disconnecting of electric cords by pulling on the cords rather than on the plug;

o. Use of metal ladders while working on electrical equipment;

p. Failure to label switch panels and boxes.

3. Lack of Knowledge: Teaching a basic understanding of electrical safety is part of an Industrial Arts Educational Program.

Ground Fault Protection - a recent development that can save lives. Devices are now readily available which give sure protection against electrocution or serious shock from defective portable tools or cords. Their use should be encouraged in all areas, but particularly where there is a serious shock hazard from wet conditions or other conditions causing massive grounding of the student.

In summary, an adquate program for the prevention and elimination of electrical hazards must rest upon:

a. Intelligent selection and purchase of equipment;

b. Correct installation of equipment;

c. Education of students in the safe use of electrical energy;

d. Periodic inspection of equipment;

e. Regular maintenance.

FIRE SAFETY

1. Provide approved fire extinguisher in the shop area. Multi-purpose dry chemical units are most effective for general use. General purpose fire extinguishers should have at least a 2A:10 BC rating. Water back-up for extinguishers is always desirable. Mulit-purpose dry chemical can damage delicate electrical equipment. CO^2 type extinguishers eliminate that problem.

2. Fire extinguishers should be located along normal paths of travel and must not be obstructed or obscured from view.

3. Store flammable liquids in approved (Underwriters Laboratories or Factory Mutual labeled) safety containers and cabinets.

4. Provide for the bulk storage of flammable materials in an area removed from the main school building.

5. Provide Underwriters Laboratories Listed oily waste containers for oily and paint soaked rags. It is a good policy to place waste with high spontaneous combustion potential in water filled containers. (See National Fire Protection Association pamphlet 30, para. 4450, "Flammable and Combustible Liquids Code.")

6. Provide for the inspection and testing of fire extinguishers at regular intervals to ascertain that they are fully charged and in proper working condition (See National Fire Protection Phamplet 10, "Standard for Portable Fire Extinguishers" for details.) It is suggested that your school district adopt the labeling system using the Symbol Signs.

7. Provide instruction to students in the location and proper use of fire extinguishers and other fire fighting equipment.

8. Segregate oxidizers and oily material in storage. Do not use oxidizer (peroxide catalyst) containers for other purposes.

9. Post fire alarm and evacuation procedures.

10. Students should know remote shut-off valve or switch locations for gas or oil fired equipment and how to de-energize electrical equipment in an emergency.

11. Deluge showers would be desirable in all industrial arts laboratories, especially where there is danger of fire igniting clothing made of synthetic materials.

12. An approved fire blanket should be provided in each laboratory.

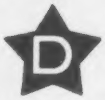
NEW FIRE EXTINGUISHER SYMBOLS

Picture symbols showing the uses for each of four types of fire extinguishers were approved for use in May, 1978. The reason for change was ease of recognition. It was felt that the old symbols, which showed a letter--A, B, or C--in a geometric shape, could be easily confused if you didn't know what the symbol meant.

The new symbols consist of three panels, each of which depicts the nature of one class of fire, and whether or not the extinguisher can be used on them.

Colors used in these symbols are important because they show at a glance the hazard for which an extinguisher is applicable. Panels printed in blue show the class of fire for which it is safe to use the extinguisher. Panels that show a class of fire on which it is dangerous to use the extinguisher are printed in black with a red slash running diagonally through the panel.

The symbol for Class "D" fires remains the same because this class of fire is rare. A class "D" fire occurs in combustible metals such as magnesium, titanium, zirconium, and sodium. The proper extinguisher must be used. Normal extinguishing agents should not be used on metal fires because there is a danger of increasing the intensity of the fire as a result of a chemical reaction.



PERSONAL PROTECTION

1. HEAD

   A. Confine long hair so that it is not exposed to machinery.

   B. Provide hard hat where appropriate.

2. EYE-FACE

   A. Require the wearing of appropriate safety equipment where there is a danger of injury. (See ANSI Eye Protection Chart.)

3. RESPIRATORY

   A. Provide respirators for student use where harmful dusts or fumes exist. (See Respiratory guideline.)

   B. Ensure adequate ventilation for dusts, fumes, and vapors.

4. BODY PROTECTION

   A. Prohibit the wearing of loose clothing in the laboratory.

   B. Require students to remove rings and other jewelry while working in the laboratory.

   C. Provide leggings and foot protection, armlets, gloves, aprons, and shields when working with molten material.

   D. Make certain that the appropriate protective clothing is used when handling harsh materials that would cause chemical burns or lacerations.

5. HEARING

   A. Where noise levels are excessive over long periods of time, ear protection should be worn. (See Permissible Nose Exposure Table.)

   B. Engineering solutions should be sought out to remedy excessive noise problems.

   C. Monitor noise levels with a Type 2A noise level meter.

6. PERSONNEL PROTECTION CAUTIONS

   A. Determine the physical defects and limitations of all students so that they will not be assigned tasks detrimental to their health or physical condition.

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B. Substitute and alternate protective fabric for asbestos garments. Asbestos is detrimental to the health of the wearer and should be avoided.

EYE PROTECTION

1. The law of the Commonwealth of Pennsylvania requires that eye protection programs be developed and implemented in all areas where there are activities potentially hazardous to the eye. (See "Act No. 116"). A procedure for adaptation for school districts is as follows:

   A. All administrators and teachers shall assess the eye exposures for which they are responsible, and recommend the appropriate protection. This recommendation shall protect students, staff members, and visitors. (See Selection Chart-American National Standards Institute Z87.1-1968)

   B. It is the responsibility of industrial arts instructors to see that eye protection is worn AT ALL TIMES in those areas that have been identified as exposure areas.

   C. Eye protection shall be supplied and maintained by the school district and lent without cost to students, staff members and visitors.

   D. The physical inspection and periodic review of the eye safety program shall be the responsibility of a designated school district administrator for ensuring the effectiveness of the eye protection program.

   Reference is also made to "American National Standard Practice for Occupational and Educational Eye and Face Protection," ANSI Z87.1-1968.

   This program shall be rigidly enforced and monitored by all concerned. There should be no deviation from the program once it is accepted and put into use.

2. Students who require corrective lenses shall be encouraged to obtain prescription safety glasses. When plain prescription glasses are worn, the student should be required also to wear an appropriate cover goggle.

   Caution: Most shatter-resistant glasses do not meet the standard of ANSI and many "safety glasses" also fail the tests and design features listed.

   Contact lenses, even though covered by approved eye protection, shall not be worn in a laboratory during which an activity involving the caustic

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liquids or gases is taking place. If contact lenses are medically necessary and corrective glasses cannot be substituted for the lenses, a physician's statement will be required.

3. Storage and sanitation facilities shall be provided within the classroom for all eye protection. School district's have found that they had better eye protection programs when individual glasses had been provided for each student enrolled in the industrial arts class.

   Good eye protection devices require clean lenses. Lenses shall be cleaned daily.

   Pitted or scratched lenses shatter easily and impair vision and should be replaced. If a protective device is to be worn by more than one student, it will require a means of disinfection. The most effective method of disinfecting eye protective equipment is:

   A. Use ultra-violet sanitation cabinet.

   B. Thoroughly clean with soap and warm water periodically.

   C. Carefully dry with non-abrasive tissue.

4. School officials who are charged with the purchase of eye protection equipment should be aware of the various accident classifications and purchase the appropriate eye protection for each exposure. The following four groups represent the classification of all eye accidents:

   A. Potential Hazards From Impact:

   Possibly the greatest danger to the eyes is their accidental collision with flying objects. Chips from the chipper hammer or the metal working tool, the waste particles from grinding or woodworking, a broken tool or grinding wheel, or an improperly driven nail are all eye exposures that must be protected against. Plastic frame safety glasses with side shields afford maximum eye protection against impact damage.

   B. Potential Hazards from Chemical Splash:

   Protection is needed that absolutely seals the eye against any possible entry. For these conditions, flexible vinyl jumbo plate goggles with splash-proof indirect ventilators should be worn.

   C. Potential Hazards From Dust:

   As above. Where extreme dust hazards exist, plastic frame flexible goggles are more desirable. Safety glasses with side shields are also recommended.

D. Potential Hazards From Light Ray and Glare:

1. The light rays cast from welding and cutting operations can be highly injurious to unprotected eyes. Heat treating, metal pouring, steel and glass furnaces, and laser beams are other sources of glare.
2. In gas welding, cup type welding goggles with green filter lenses are most commonly used.
3. For electric welding, helmets are necessary to protect the head and eyes from infra-red and ultra-violet radiation burns, hot metals, chips, and flying sparks.
4. Contact lenses present specific hazards in the laboratory setting. The use of contact lenses should be discouraged in the lab.
5. Photocromatic and phototropic (photosun-photogray) lenses may not be worn as protective eyewear where hazardous infra-red or ultra-violet radiation is present.

DISCUSSION PERIOD:

Tell the class about proper maintenance of eye protection products, including storage and sanitation. Here show the safety glass monitor and start assigning glasses and storage positions.

Explain safety rules of this classroom and appoint a student "Safety Director" to help with enforcement.

Follow with questions and answers.

SHOP PRACTICES LEADING TO LIABILITY OF INSTRUCTORS

Shop Practice		Administrative practices and instructional activities designed to eliminate such practice as a factor in teacher liability.
Absence of the teacher from the shop when students are working therein.	1.	Never absent yourself from the shop while students are working in the shop.
	2.	Have a clear understanding with your principal and/or supervisor that you are not to be called from the shop during a class session.
	3.	Only under extreme circumstances should an instructor absent himself from the shop. When this occurs, lock the main switch box and provide a sedentary or reading assignment to students during your absence.
Teachers leaving the shop under the supervision of a teacher who is not qualified to teach shop work.	1.	Teachers are likely to be absent for a period of time because of illness or having to attend a teacher's meeting or conference. It is often the practice of school administrators to staff the shop with any instructor who has a free hour available.
	2.	Do not permit a substitute teacher in your shop unless he is a qualified or certified instructor.
	3.	If none is available, prepare written or reading assignments in advance, or some type of sedentary activity in which students will not be using the machines and equipment in the shop. Instructional movies or similar aids are practical if they fit into the instructional program.
Permitting students not enrolled in the class to use shop equipment and tools.	1.	Permit only those students who have participated in your shop program or who are participating to use the shop and equipment.

	2. No exceptions should be made to this practice. 3. Do not take the word of a student that he has had previous instruction on the tool or has had experience in its use.
Permitting students to use machines or tools or to perform activities for which instruction has not been given.	1. Make sure that proper instruction is given relative to each basic operation to be performed by a student in the shop class. 2. Permit no student to utilize a machine or tool in performing an operation for which instruction has not been given. 3. Keep an accurate instructional log as to those materials, machines and tools and operations in which instruction has been given.
Pupils using equipment in the shop which has not been approved by the administration and board of education.	1. Allow no student to bring in any item of equipment for use in the shop. 2. Permit students to use only those items of tools and machines that have been purchased with the approval of the School Administration.
Permitting students to work in the shop free periods, particularly when the shop is not supervised.	1. Do not be absent from your shop when students are working, even during unscheduled classes or periods. 2. Permit students to utilize equipment and work in the shop during designated periods when proper supervision is given.
Permitting students to use dull tools and/or cutting devices on machines.	1. Periodically inspect all cutting edges of power tool devices and hand tools. 2. Keep all items of equipment properly maintained and sharpened.

	3. Demonstrate the proper maintenance and care of cutting edges of safe hand tools, particularly those jobs within the ability of the student to perform.
Permitting students to perform operations on machines without guard particularly when one could have been used.	1. Provide proper instruction as to the use and adjustment of guards emphasizing the necessity and functions of such a device.
	2. Set an example yourself, by using guards and safety devices at all times, and perform operations as you would want them performed by students.
	3. Require that students use guards at all times on machines when such devices can be used.
	4. Have students secure permission to use any item of equipment. This will permit you to check on the machines to see that all guards and safety devices are properly adjusted.
Allowing use of equipment by students who are prone to accidents or who possess physical abnormalities that may cause an accident.	1. Be familiar with the work habits of students and with those who possess physical abnormalities that may necessitate restrictions being placed on their use of equipment.
	2. Require all students to secure permission before the use of any item of equipment.
	3. Limit such students to the use of machines which are within their capabilities and commensurate with whatever physical abnormalities they possess.
Sending pupils outside the shop to perform activities for the school or other departments.	1. Do not permit any students to leave the shop to perform activities outside the department.
	2. Refuse to undertake projects or jobs that require the student to work away from the shop without your continuous supervision.

	3. Confine instructional and maintenance activities to those that can be performed in the shop.
Failure to keep accurate written reports relative to accidents.	1. Prepare an accident form for your shop if the school system does not have a standard form. 2. Fill out the form as soon after the accident has taken place. Make multiple copies and keep one for yourself.
Failure to secure written statement from witnesses to shop accidents.	1. Provide a place on your accident report form for the listing of witnesses. 2. Have witnesses write, in their own words, their views as to how the accident happened. 3. Have witnesses sign their signature to their statement.
Failure to administer safety tests to students in case of liable suit for negligence.	1. Administer safety tests to students upon completion of the demonstration of a specific machine, tool, or process. 2. Keep tests on file in your office as evidence that such material has been covered and that a test was actually administered over material. 3. Set a critical score above which students must achieve in order to use a specific item of equipment. Many instructors demand a "perfect paper" prior to letting students use such equipment.
Failure of the teacher to exercise the utmost of of caution.	1. The teacher MUST anticipate where and how an accident will occur, and use every means to eliminate the possibility of an accident. 2. Make every possible effort to provide the safest possible physical facilities and implement an effective safety instructional program.

Contributory Negligence

The term "contributory negligence" can be interpreted in a very broad sense. However, the following suggestions are given with a view in mind of eliminating the possibility of a teacher being charged with "contributory negligence":

1. Maintain the safest of working conditions in the shop.
2. Insist on safe practices being adhered to at all times in the shop.
3. Provide complete and proper instruction in all aspects of shop work, with regard to the use of tools, machines,and materials.
4. Make recommendations to superiors as to improvements that can be made to improve safety conditions in the shop.
5. Make improvements suggested by your superiors.
6. Establish safety rules and enforce them.
7. Organize and implement a "complete" and continuous safety education program.

Failure to effectively administer a comprehensive eye safety program.

1. Be familiar with and conversant about eye safety legislation.
2. Require all students to wear eye protection devices at all times for laboratory activities.
3. Know the appropriate eye safety device for each operation.
4. Set an example yourself by always wearing the appropriate eye protection devices.

INDUSTRIAL ARTS DEPARTMENT

Student Accident Report

TO BE COMPLETED BY INSTRUCTOR

Student Name____Grade______

Location of Accident____________________Time______A.M.______/______P.M.
(Lab Area)

Date of Accident______________________

Description of Injury____

____

____

Location of Instructor when Accident Occurred:______________________

Description of How Accident Happened:____________________________

____

____

Indicate Equipment, Machinery, or Tools Involved:____________________

Describe unsafe practices, if any, contributing to accident:____________

____

____

Suggestions for prevention of similar accident:______________________

____

____

Witnesses to Accident: 1.______________________________________

2.______________________________________

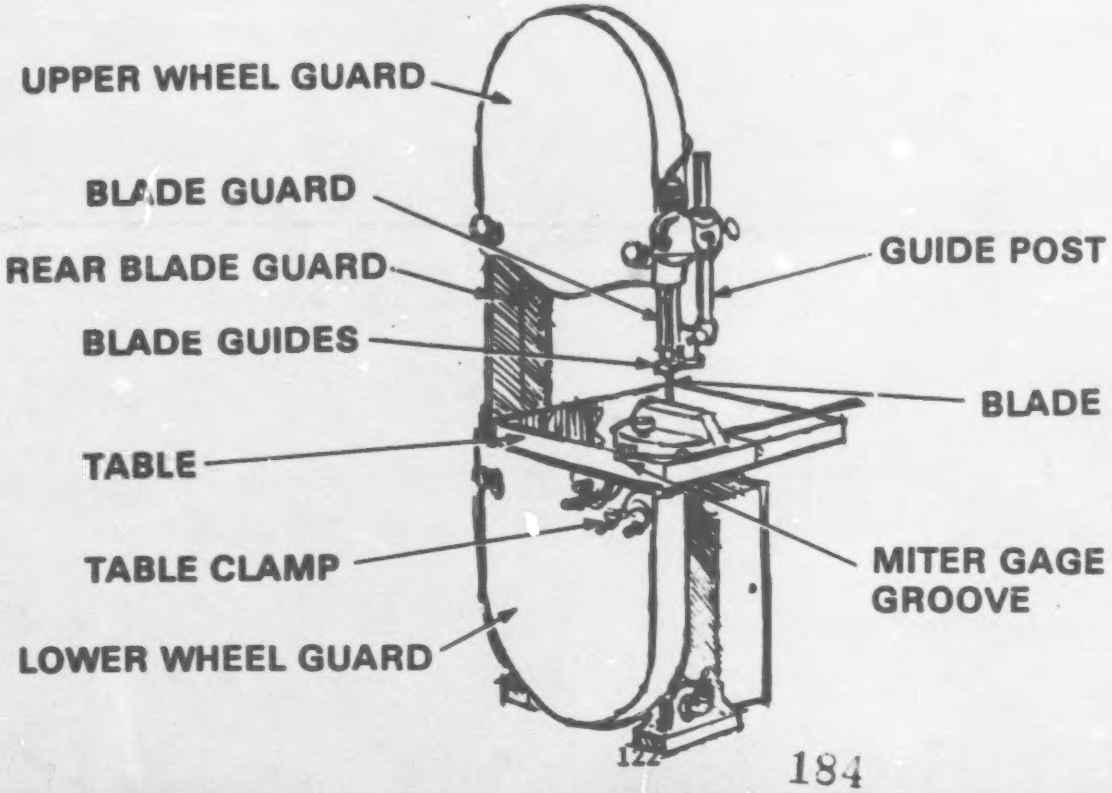
Instructor's Signature__________________________Date______________

Student's Signature____________________________Date______________

NOTE: One Copy to be filed with Department Chairman

For Safety —

1. Operate only with instructor's permission and after you have received instruction.
2. Remove jewelry, eliminate loose clothing, and confine long hair.
3. Make sure all guards are in place and operating correctly.
4. Always use proper eye protection.
5. Make sure all adjustments are tight and secure and blade guides are properly adjusted.
6. Upper blade guides should be positioned about 1/8" above the work piece.
7. Guide the work slowly, letting the machine do the work. Do not force the work into the blade.
8. Do not attempt to cut a smaller radius than the blade will allow.
9. Avoid backing out of a cut.
10. Place hands or fingers on each side of the cut line, never on the line. Use a scrap push block if necessary.
11. Never leave the machine until it has come to a full stop.



Band Saw

Name ______________________________

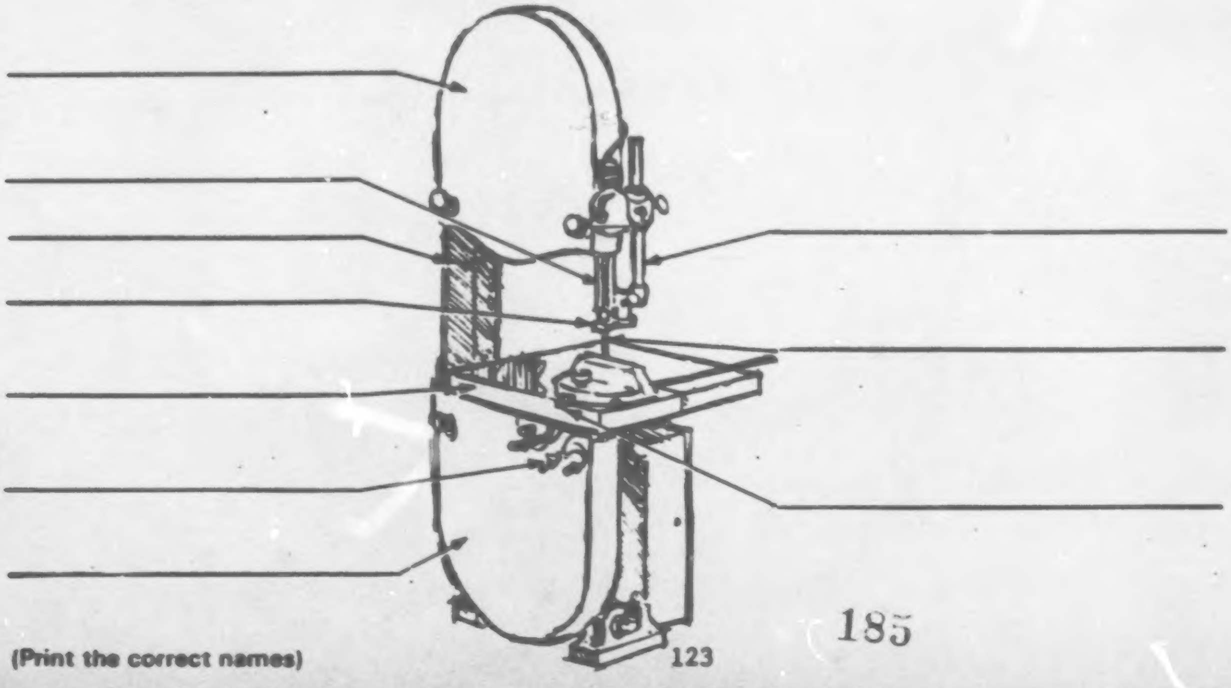
Class ______________________________

Date ________________ Grade ________

Safety Quiz

(Circle True or False)

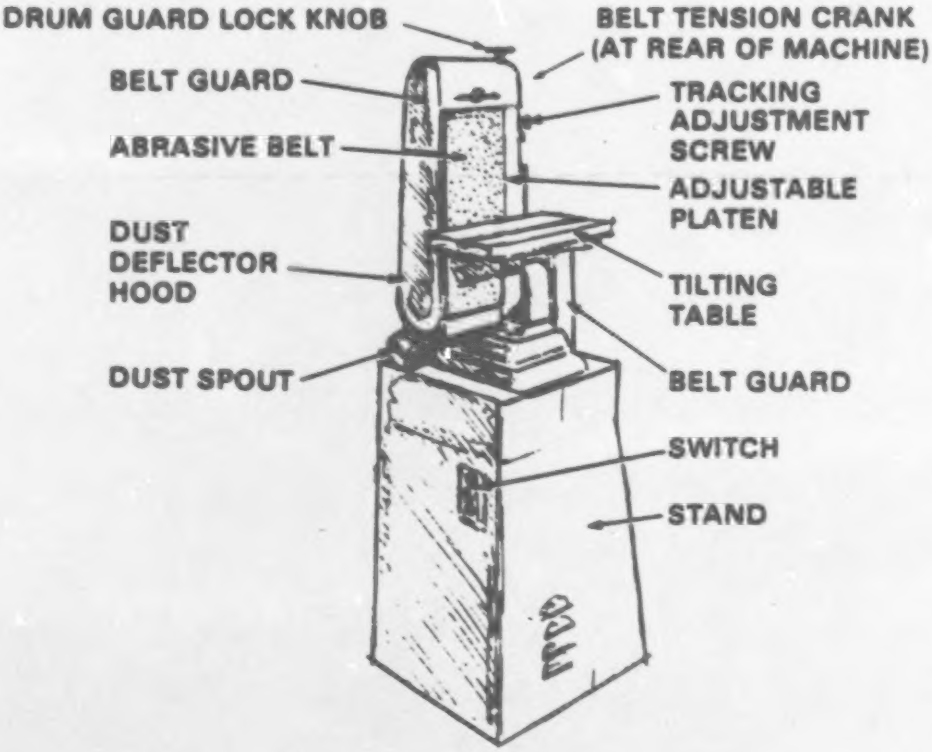
1. The lower wheel does not require a guard. T F
2. The upper guide should be adjusted to within 1/8" of the work piece. T F
3. All normal adjustments should be made with the power turned off. T F
4. It is permissible and safe to force the material around a tight radius. T F
5. Fingers should be placed on each side of the cut line and the material guided through the machine. T F
6. When necessary it is possible to back slowly out of a cut. T F



(Print the correct names)

For Safety —

1. **Operate only with instructor's permission and after you have received instruction.**
2. **Remove jewelry, eliminate loose clothing, and confine long hair.**
3. **Make sure all guards are in place and operating correctly.**
4. **Always use proper eye protection.**
5. Make all adjustments except final belt tracking with the power off.
6. Make sure there is adequate strong tension on the belt and that it is not torn.
7. When changing belts make sure the new belt runs as arrows indicate.
8. The table should be adjusted to within 1/16" of the abrasive belt.
9. Keep hands clear of the abrasive belt while operating and keep material flat on the table.
10. The belt must be re-tracked if the angle of the basic machine is changed.



S

Belt Finishing Machine

Name ______________________

Class ______________________

Date ______________ Grade __________

Safety Quiz

(Circle True or False)

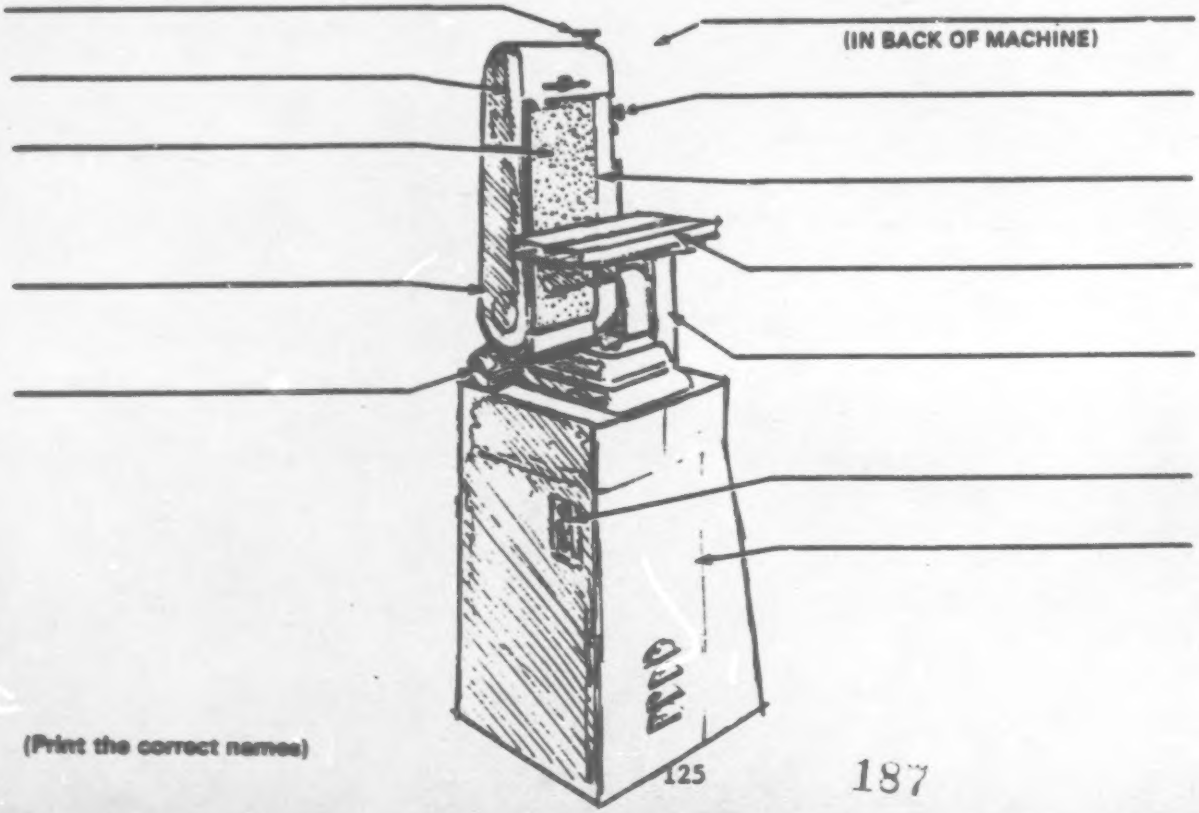
1. Material may be safely sanded in the center of the platen. T F

2. The table should be ¼" away from the belt for adequate clearance. T F

3. If the angle of the unit is changed belt tracking should checked. T F

4. There are directional arrows inside the belt. T F

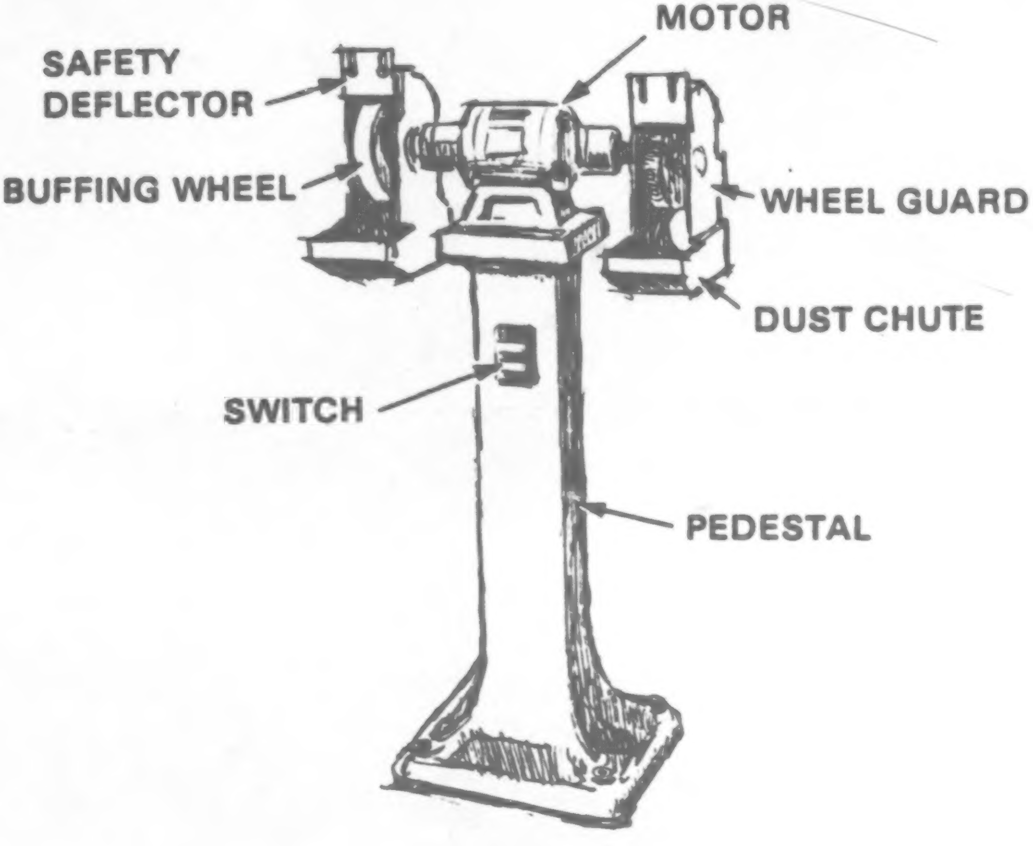
5. The guards cannot be removed from this machine. T F



(Print the correct names)

For Safety —

1. Operate only with instructor's permission and after you have received instruction.
2. Remove jewelry, eliminate loose clothing, and confine long hair.
3. Make sure all guards are in place and operating correctly.
4. Always use proper eye protection.
5. Always buff using the lower half of the buffing wheel.
6. Stand to one side of the wheel when buffing or applying compound.
7. Use care when buffing around corners or openings where the wheel could grab and throw the work piece.
8. Never use gloves, rags, or part of a shop coat to hold the work piece.
9. Never buff a leading edge.



Buffer

S

Name

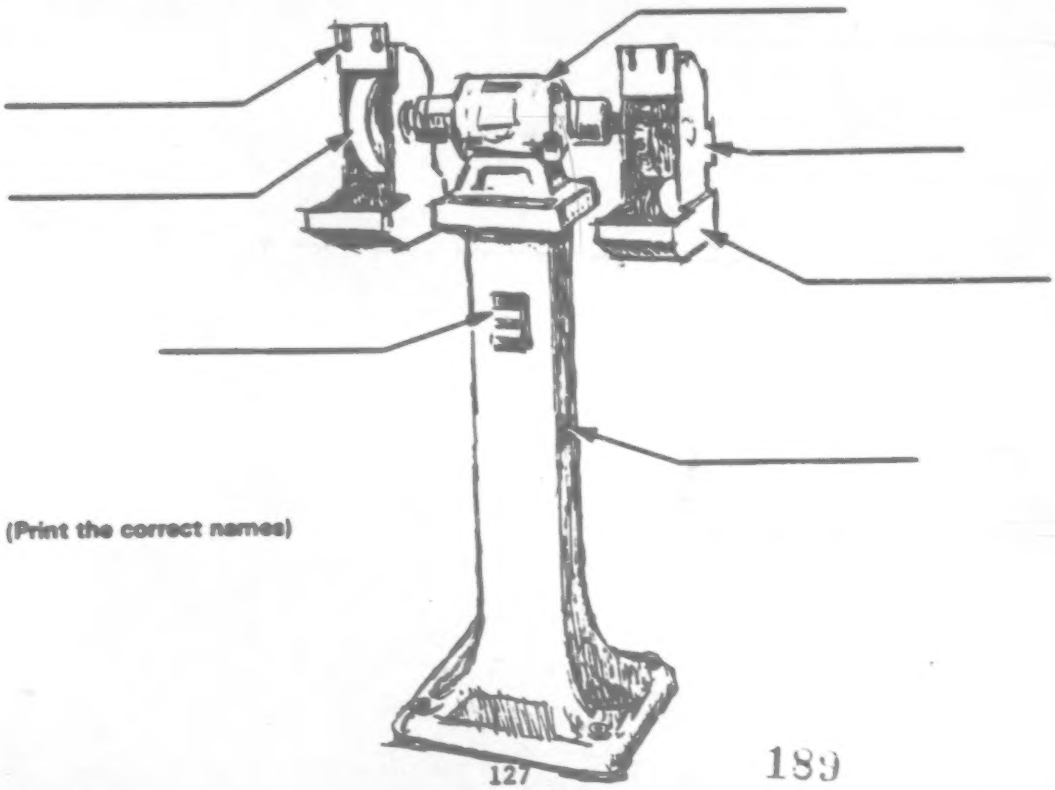
Class

Date   Grade

Safety Quiz

(Circle True or False)

1. A rag should be used to hold hot objects while buffing. T F
2. Always buff on the lower half of the wheel. T F
3. Loose clothing or hair must be confined. T F
4. Eye protection must be worn when buffing. T F
5. Use extra caution when buffing corners or confined areas of the work. T F



(Print the correct names)

Circular Saw

S

Name

Class

Date Grade

Safety Quiz

(Circle True or False)

1. It is safe to saw freehand. T F

2. The fence should always be used. T F

3. The guard is not always necessary. T F

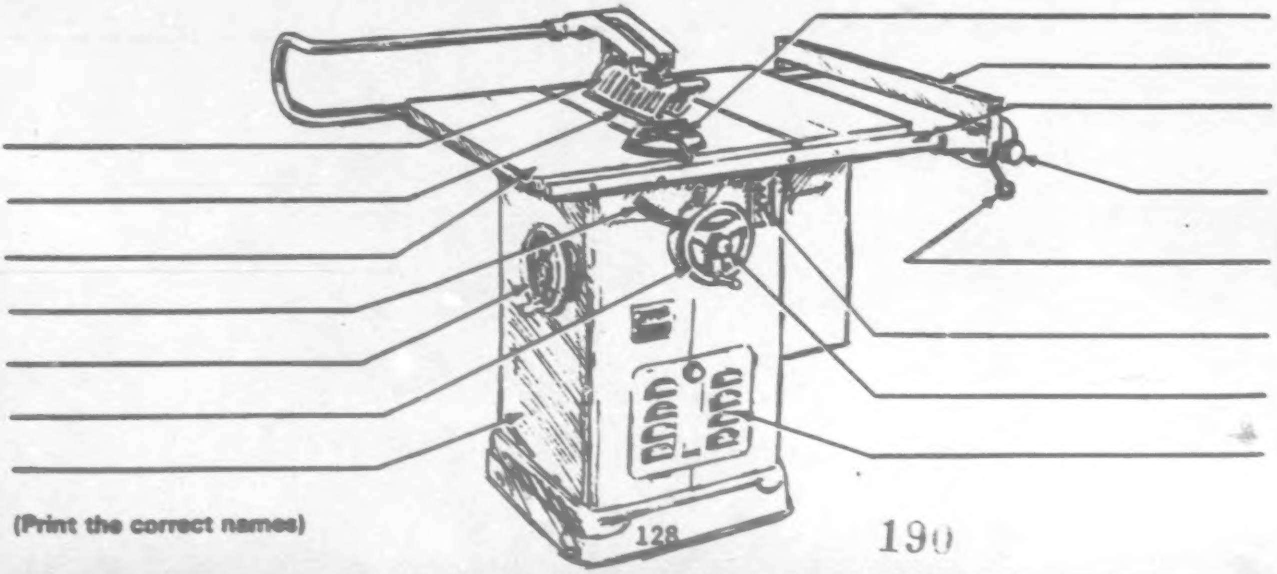
4. When ripping it is best to stand directly behind the blade. T F

5. Eye protection should be worn when using a table saw. T F

6. The saw blade should be adjusted so that the teeth clear the thickness of material to the depth of the gullets. T F

7. A helper or roller should be used when ripping long pieces. T F

8. A push stick is necessary when ripping narrow stock. T F

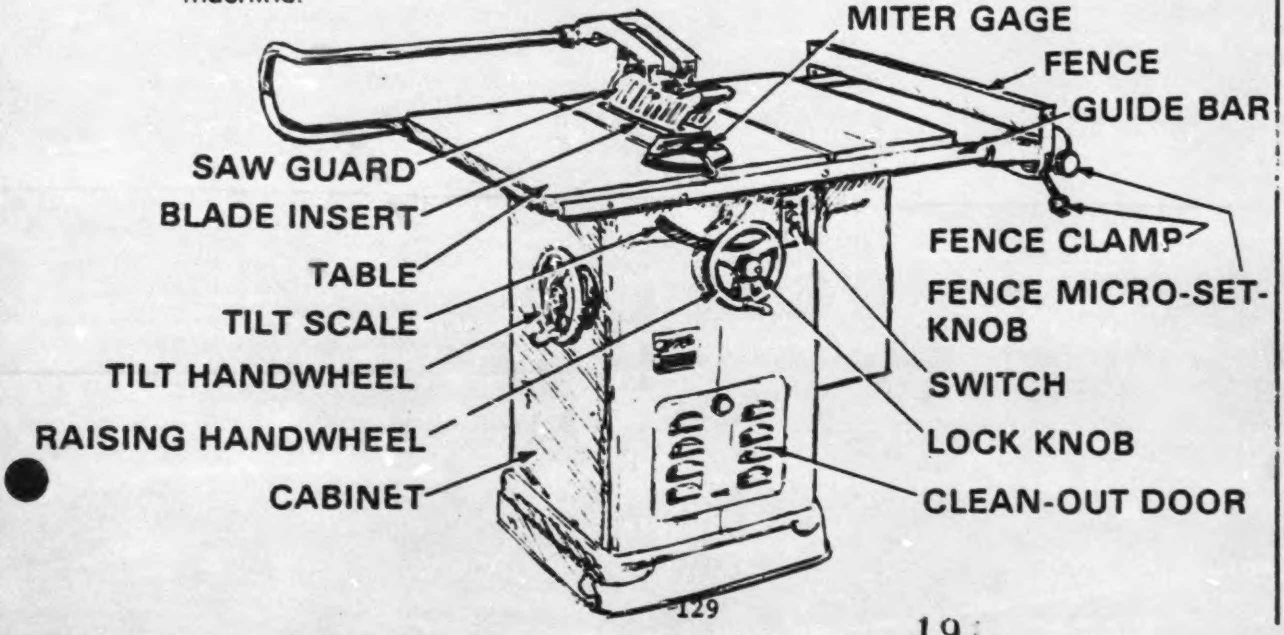


(Print the correct names)

Circular Saw

For Safety —

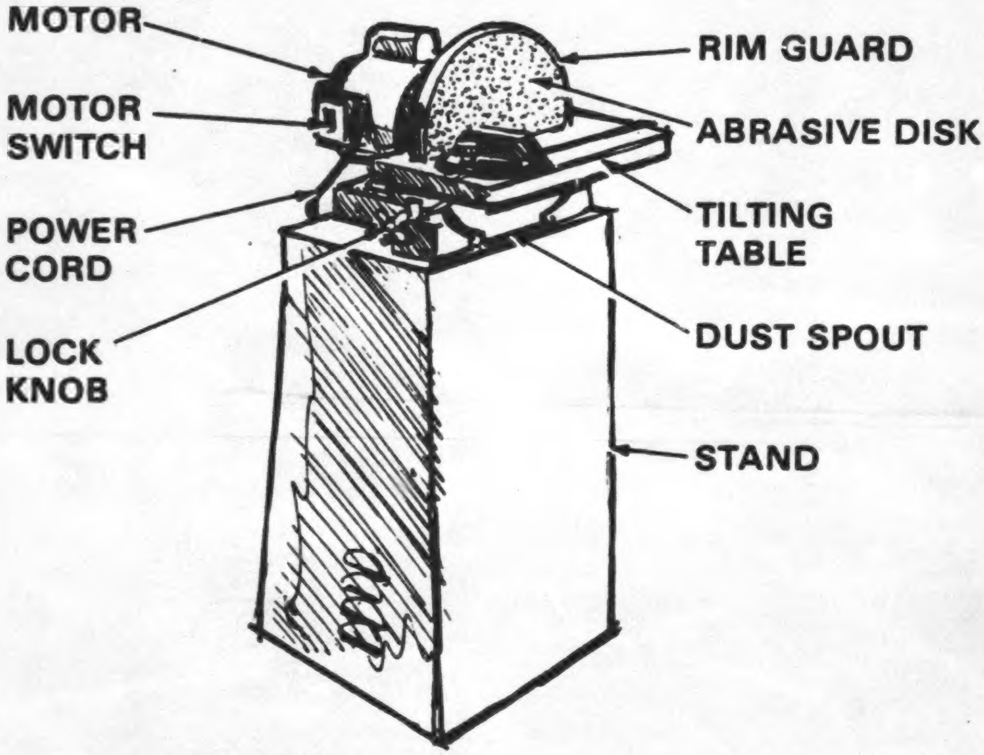
1. **Operate only with instructor's permission and after you have received instruction.**
2. **Remove jewelry, eliminate loose clothing, and confine long hair.**
3. **Make sure all guards are in place and operating correctly.**
4. **Always use proper eye protection.**
5. Make all adjustments and remove chips or dust with the power off.
6. Never use the miter gage and fence together in the same operation.
7. The saw blade should extend above the work piece untill the gullets of the blade clear the material.
8. Never saw free hand. Use the miter gage when cross cutting, the fence when ripping.
9. Never reach over the saw blade.
10. Use extra care and precaution when sawing large material, or when using a dado or molding cutter head.
11. Use a push stick when ripping narrow stock or when hands would be close to blade.
12. Do not stand in line of the cut when operating the saw.
13. Lower the blade and be sure it has come to a full stop before leaving the machine.



Disc Finishing Machine

For Safety —

1. Operate only with instructor's permission and after you have received instruction.
2. Remove jewelry, eliminate loose clothing, and confine long hair.
3. Make sure all guards are in place and operating correctly.
4. Always use proper eye protection.
5. Make sure adhesive is holding abrasive disc tightly to the revolving platen.
6. Abrasive disc should not be torn or damaged.
7. Material should be held flat against the table and hands kept clear of the abrasive disc.
8. The table should be adjusted to within 1/16" of the disc.
9. Work must be done on the side of the disc rotating downward.
10. Do not leave this machine until it has coasted to a full stop or been stopped with a piece of scrap wood.



S

Disc Finishing Machine

Name ____________________________

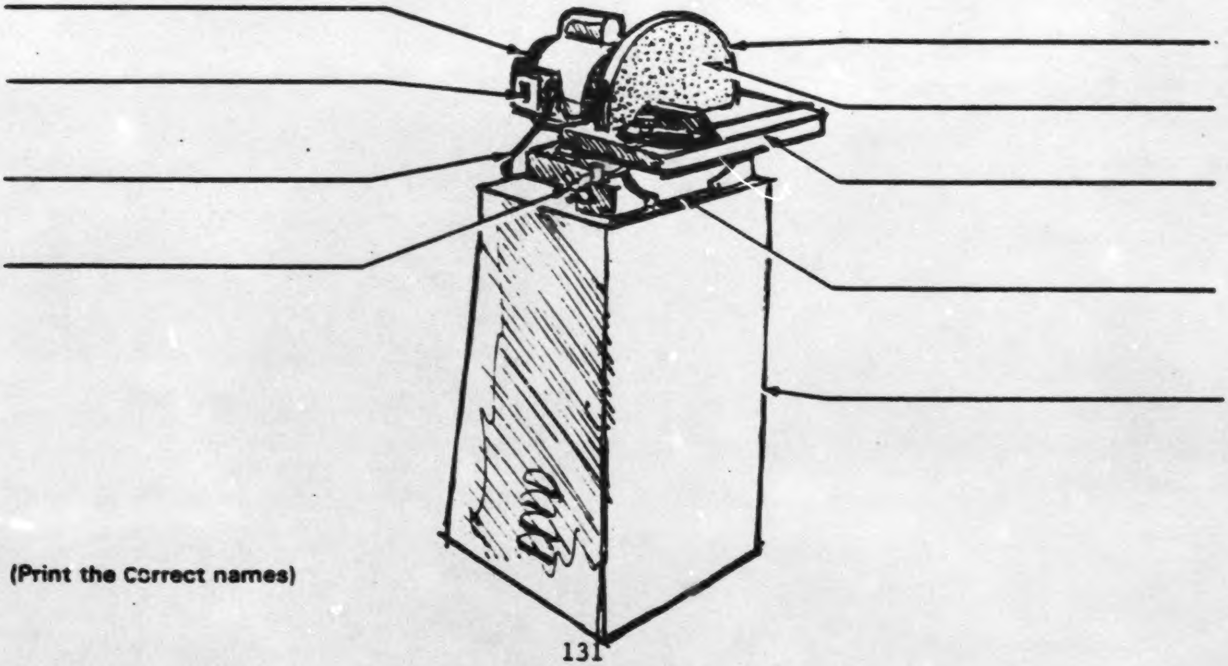
Class ____________________________

Date __________________ Grade __________

Safety Quiz

(Circle True or False)

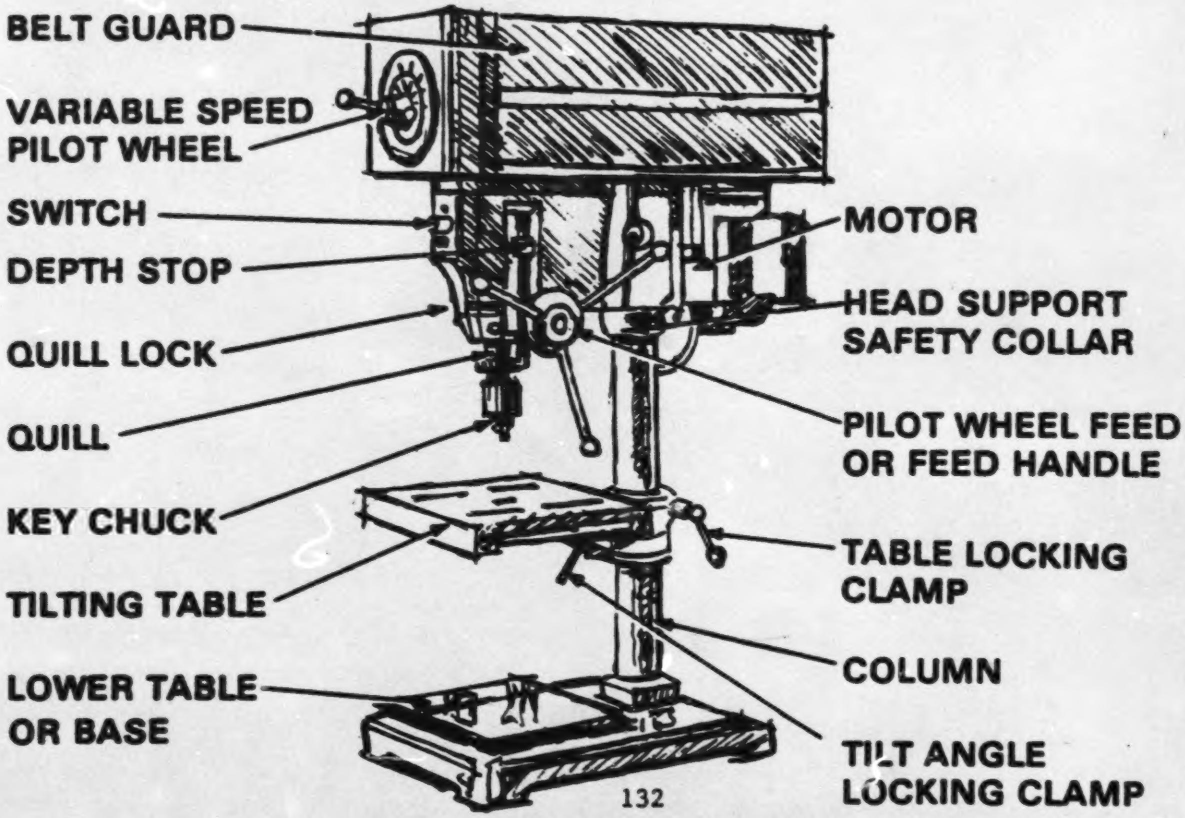
1. Sanding can be safely done on either the left or right side of the rotating disc. T F
2. The Rim Guard is of no real value and can be removed for most operations. T F
3. The table should be adjusted to within 1/16" of the disc. T F
4. A piece of scrap lumber can be used to slow down and stop the disc after turning off the power. T F
5. The table may be tilted safely while the machine is running. T F



(Print the Correct names)

For Safety —

1. Operate only with instructor's permission and after you have received instruction.
2. Remove jewelry, eliminate loose clothing, and confine long hair.
3. Make sure all guards are in place and operating correctly.
4. Always use proper eye protection.
5. Hold material securely with vise or clamps.
6. Be sure key is removed from chuck.
7. Select a properly sharpened bit. For metal, center punch when hole is to be drilled.
8. Turn off power if work piece is caught in the drill. Do not stop by hand.
9. Adjust table or depth stop to avoid drilling into the table.
10. Select the correct speed, normally slower for metal-faster for wood. The larger the bit, the slower the speed.



Name ______________________________

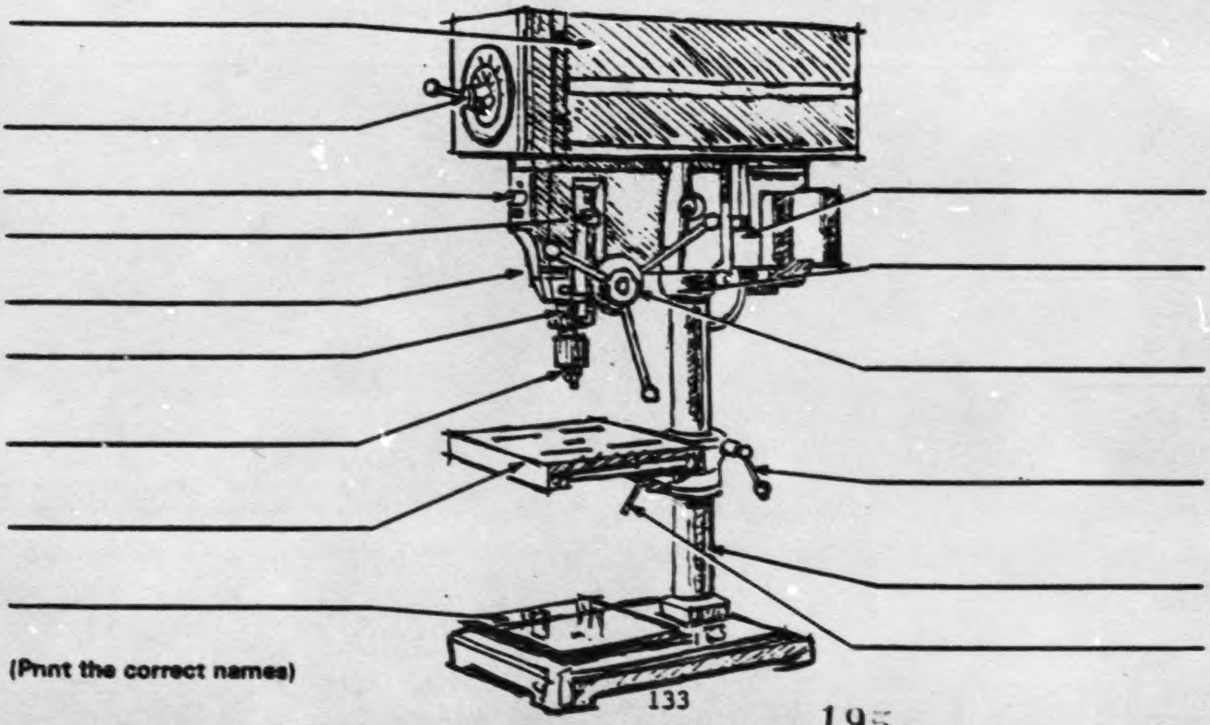
Class ______________________________

Date ________________ Grade ________

Safety Quiz

(Circle True or False)

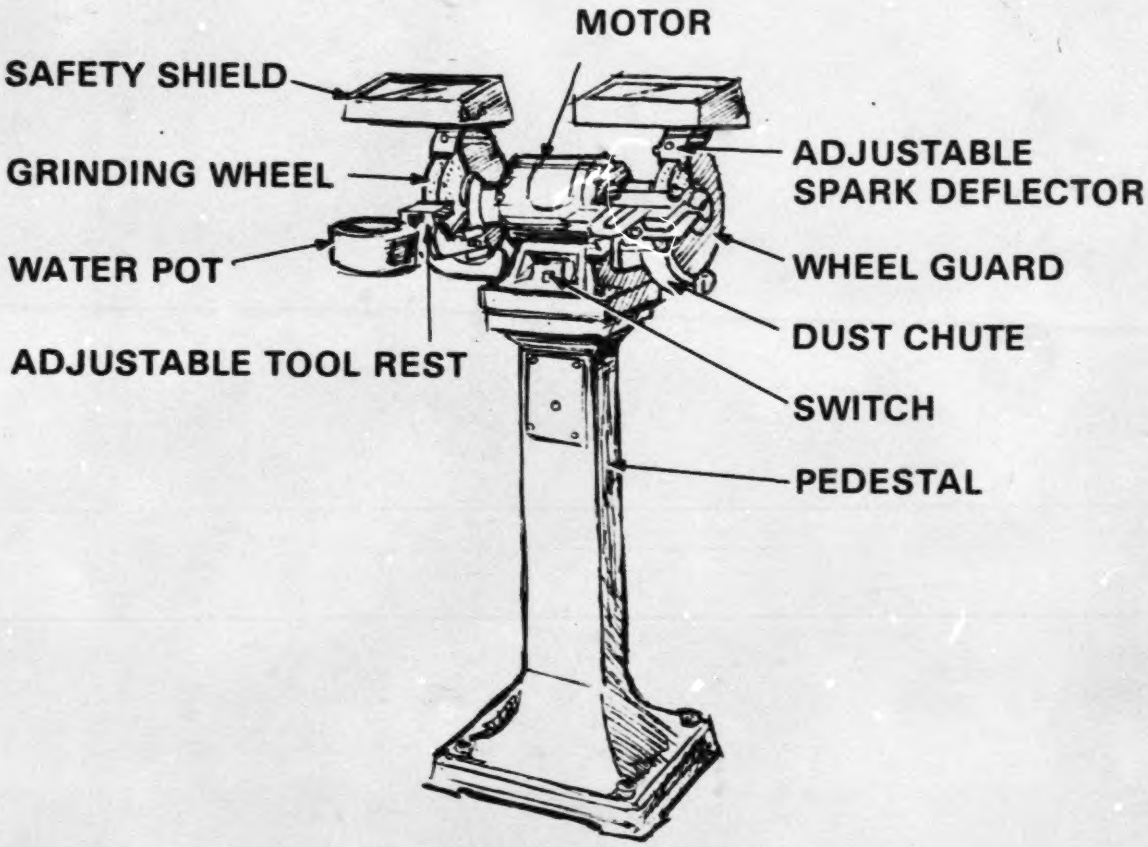
1. It is necessary to select the proper speed. T F
2. The chuck key should be kept in the chuck at all times. T F
3. Work should always be secured. T F
4. Rings may be worn while operating a drill press. T F
5. A chip brush should be used for removing chips. T F
6. The drill should be operated at top speed for all work. T F
7. The long end of the work should be to the left of the operator. T F



(Print the correct names)

For Safety —

1. **Operate only with instructor's permission and after you have received instruction.**
2. **Remove jewelry, eliminate loose clothing, and confine long hair.**
3. **Make sure all guards are in place and operating correctly.**
4. **Always use proper eye protection.**
5. The tool rests must be adjusted to within 1/16" of the grinding wheel.
6. Spark deflectors must be adjusted to within 1/16" of the grinding wheels.
7. Do not grind on the side of the grinding wheels.
8. Stand to one side when starting the machine.
9. Discard or report grinding wheels that are excessively small or cracked.
10. Small work pieces should be held with the "vise grip" type of pliers.
11. Do not leave the machine until the grinding wheels have come to a full stop.



Name ____________________________

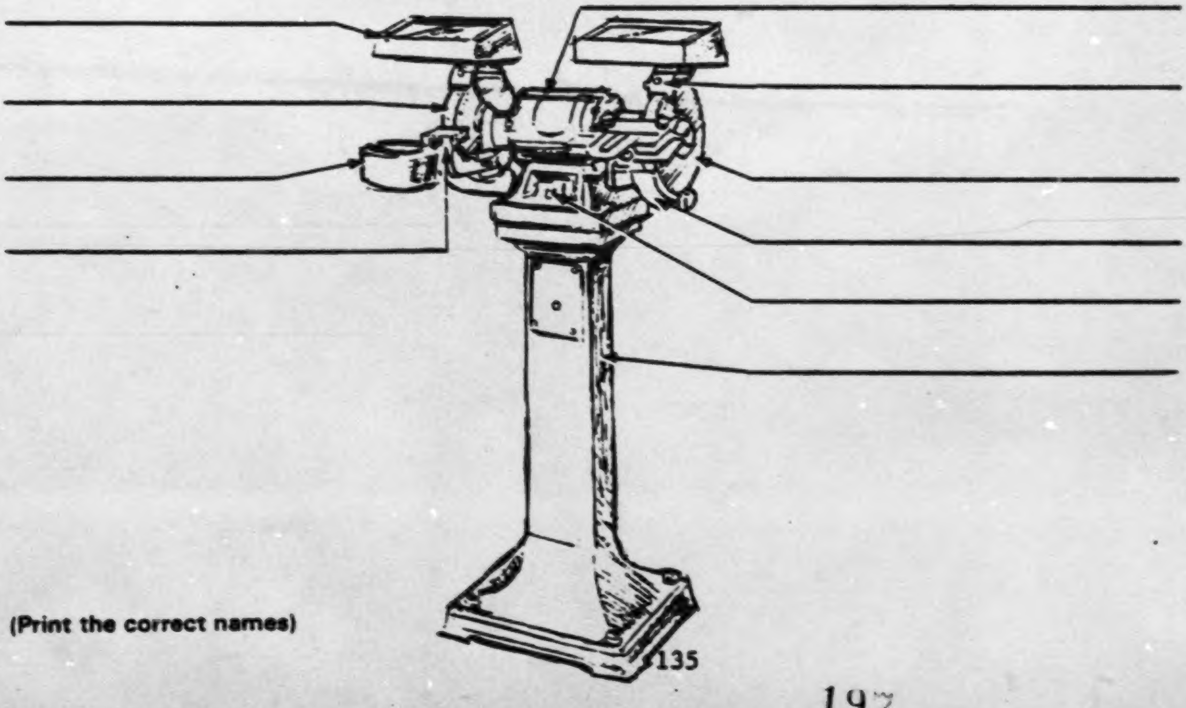
Class ____________________________

Date ________________ Grade __________

Safety Quiz

(Circle True or False)

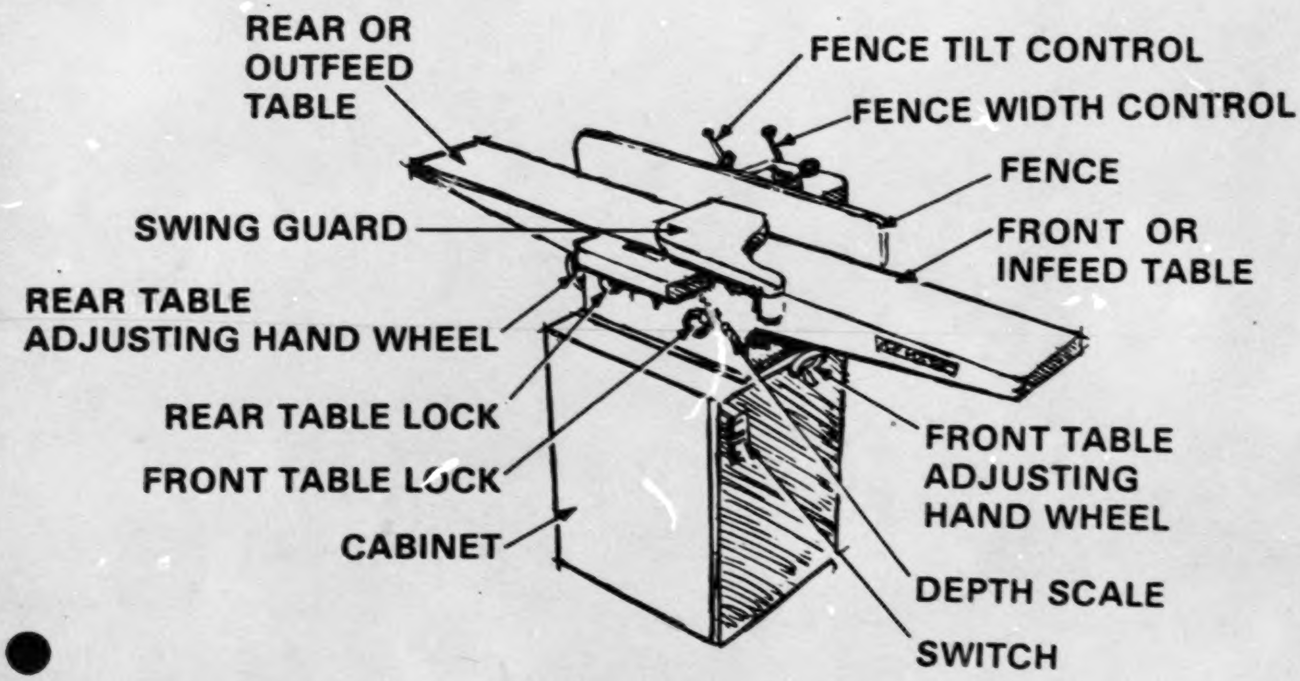
1. The tool rest should be adjusted to within 1/2" of wheel.	T	F
2. Eye protection is always necessary while grinding.	T	F
3. Once the "off" switch is in the off position, the operator may leave.	T	F
4. Wheels that are slightly cracked may be used.	T	F
5. The spark arrestor is not necessary if there is a safety shield.	T	F
6. When grinding a small piece of steel, "vise grips" are advised.	T	F



(Print the correct names)

For Safety —

1. **Operate only with instructor's permission and after you have received instruction.**
2. **Remove jewelry, eliminate loose clothing, and confine long hair.**
3. **Make sure all guards are in place and operating correctly.**
4. **Always use proper eye protection.**
5. Make all adjustments with the power turned off.
6. A push stick or push block must be used when hands would pass over-or within 2" of the cutter head.
7. Make several light cuts (1/16" to 1/8") instead of one heavy cut (1/2").
8. The absolute minimal length of material that may be jointed is twice the size of the knives - 6" jointer, 12" - 8" jointer, 16".
9. Do not adjust or move the rear or out feed table without permission.



Name ____________________

Class ____________________

Date ____________ Grade ________

Safety Quiz

(Circle True or False)

1. It is possible for the guard to stick and not cover the cutter. T F

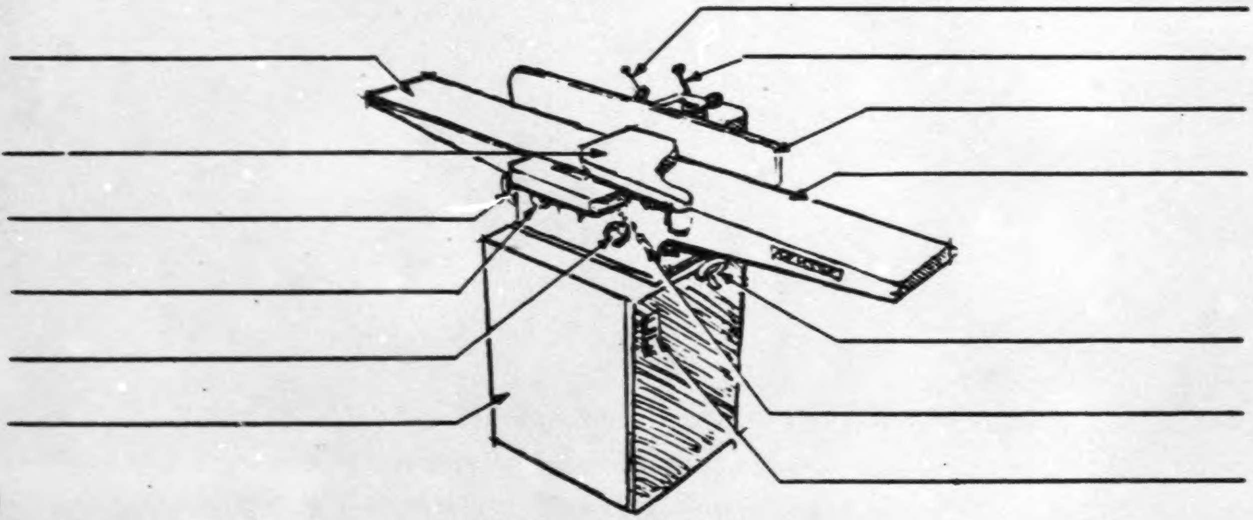
2. A push stick should be used when the hands could get close to the cutter. T F

3. Eye protection is not necessary when operating a jointer. T F

4. Permission should be obtained before using the jointer. T F

5. Stock shorter than 6" may be processed on the jointer. T F

6. In order to remove 3/8" you should make three passes 1/8" deep. T F

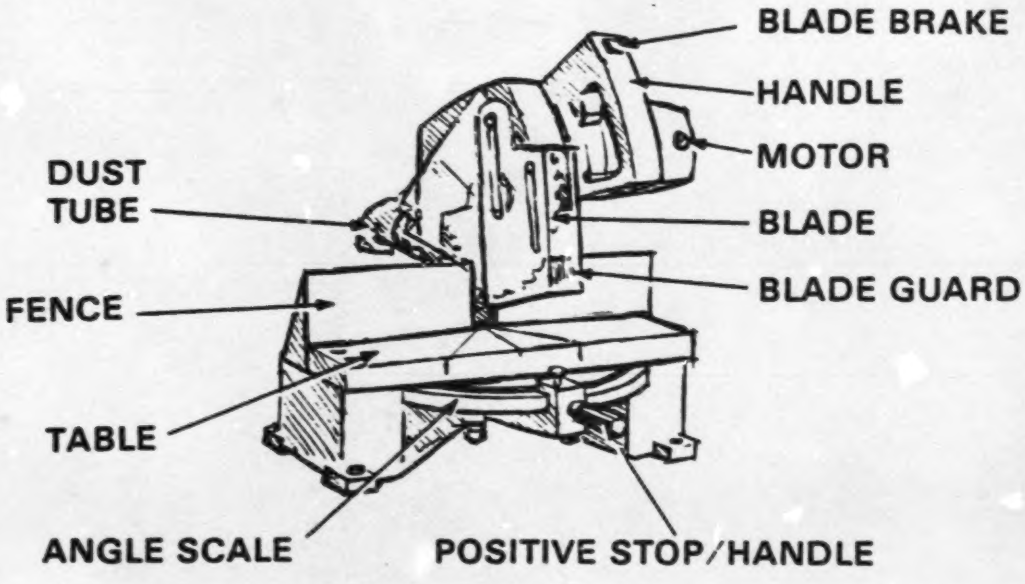


(Print the correct names)

Motorized Miter Box

For Safety —

1. **Operate only with instructor's permission and after you have received instruction.**
2. **Remove jewelry, eliminate loose clothing, and confine long hair.**
3. **Make sure all guards are in place and operating correctly.**
4. **Always use proper eye protection.**
5. Be sure power is disconnected before making angle adjustments or changing blades.
6. Always hold the work firmly against the fence and table.
7. Install a new table if adequate support has been cut away.
8. Allow the motor to reach full speed before starting to cut.
9. Use the brake to stop the blade before removing scrap or chips from the work area.
10. Be sure guard parts are functioning properly.



Name ______________________________

Class ______________________________

Date ________________ Grade __________

Safety Quiz

(Circle True or False)

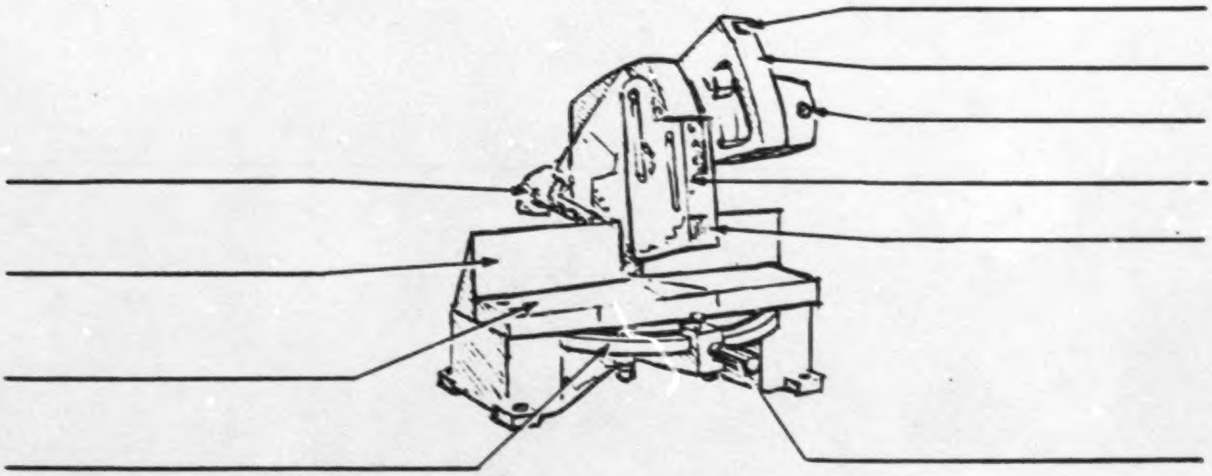
1. The table on this machine can be cut so often that it no longer gives safe support to the work. T F

2. The machine should be stopped by pushing a piece of scrap against the side of the blade. T F

3. The guard sections can easily be checked for proper operation before starting to use the machine. T F

4. The trigger switch and the brake button can be used together to gain better control. T F

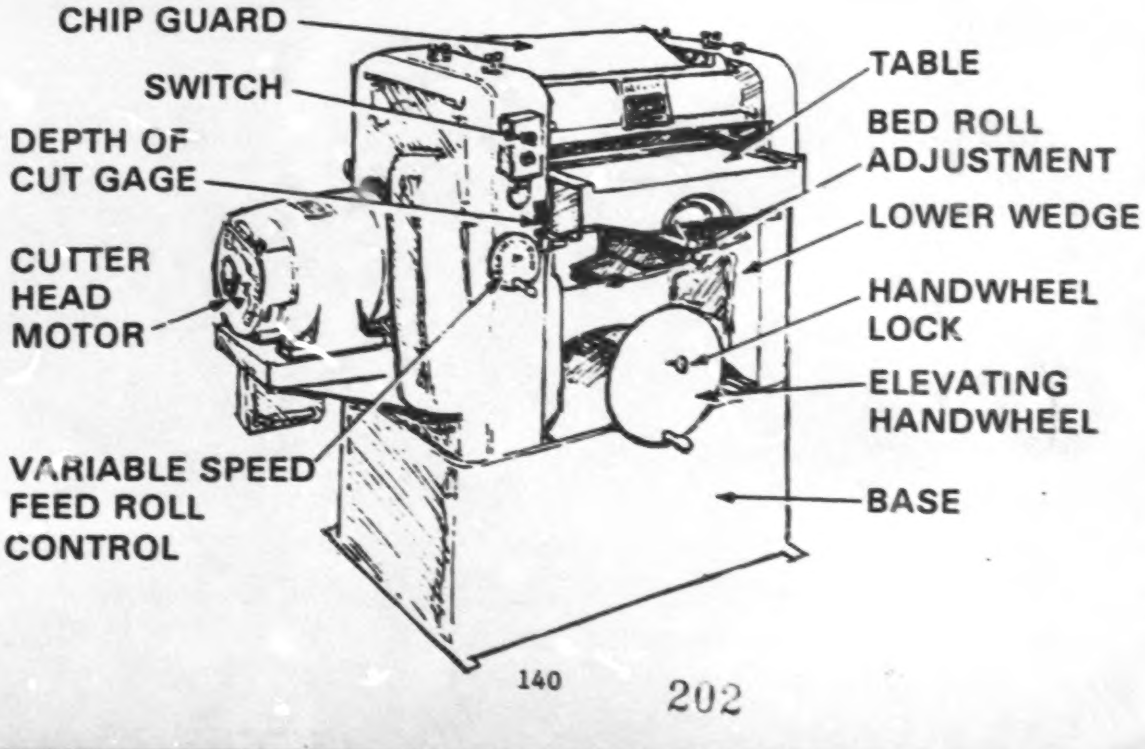
5. A warped or twisted work piece is not really dangerous. T F



(Print the correct names)

For Safety —

1. **Operate only with instructor's permission and after you have received instruction.**
2. **Remove jewelry, eliminate loose clothing, and confine long hair.**
3. **Make sure all guards are in place and operating correctly.**
4. **Always use proper eye protection.**
5. Be sure to check all material for loose knots, nails and other foreign objects.
6. Do not force stock through the planer. Keep hands off the material and let the power feed operate.
7. Select the proper depth of cut and the rate of speed depending on the stock being planed.
8. Thin stock should be properly supported by a jig or back up board. Check with the instructor for minimal thickness and length.
9. Never look directly into the throat of a planer at table level while it is running or in operation.
10. Remove shavings or chips when the power is turned off. Keep hands away from chip guard and the point of operation.
11. Do not stand directly in front of the machine in line of possible kick back.



Name ______________________

Class ______________________

Date ______________ Grade __________

Safety Quiz

(Circle True or False)

1. There is no real minimum regarding thickness or length of stock which can be planed safely. T F

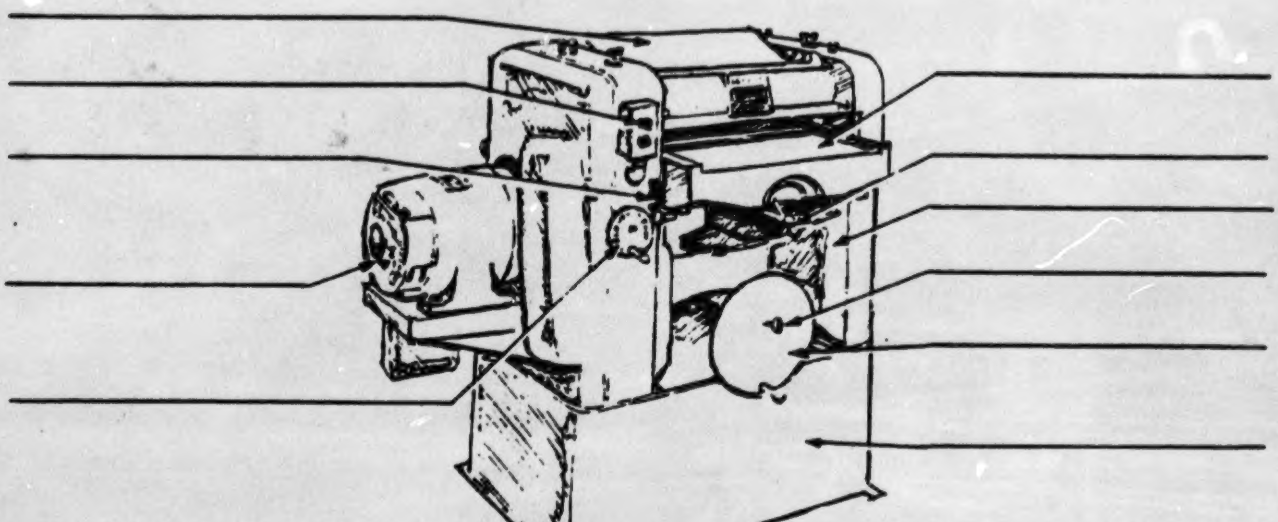
2. Stock should be pulled through the planer by hand. T F

3. You should never look into the throat area at table level. T F

4. The power should be turned off while removing chips or shavings. T F

5. A jig or other support is often needed for thin stock. T F

6. The proper depth of cut and rate of speed is related to the material being planed. T F

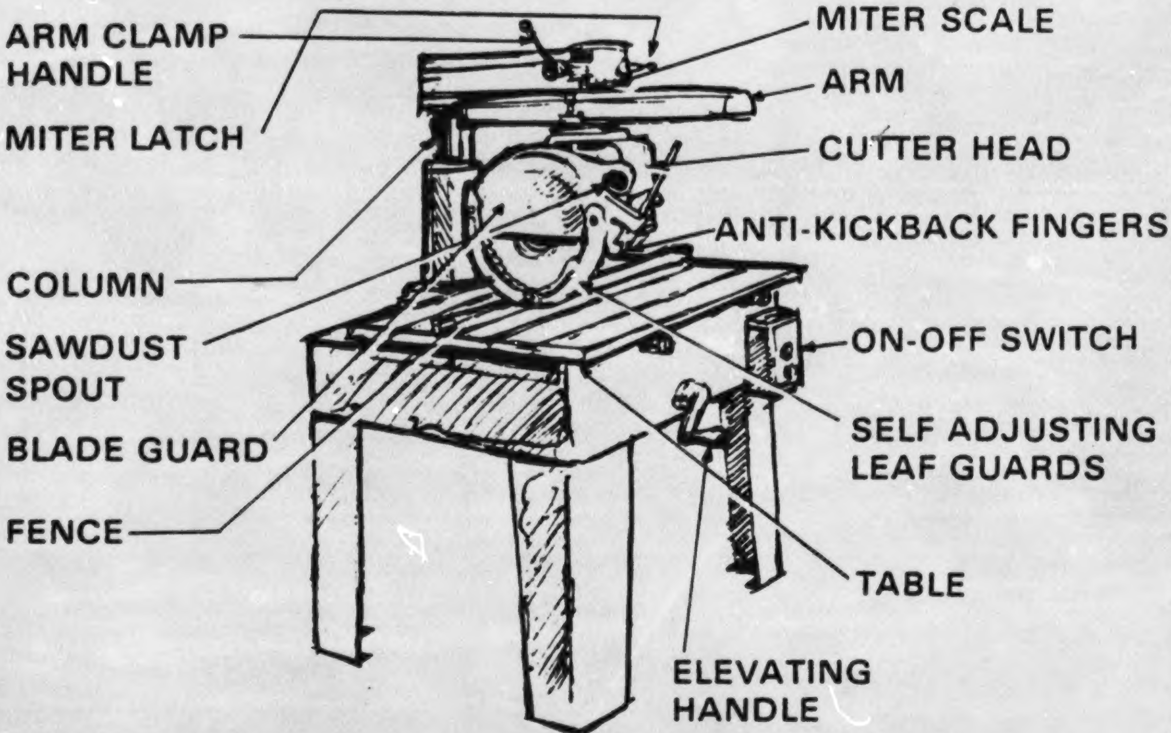


(Print the correct names)

Radial Arm Saw

For Safety —

1. Operate only with instructor's permission and after you have received instruction.
2. Remove jewelry, eliminate loose clothing, and confine long hair.
3. Make sure all guards are in place and operating correctly.
4. Always use proper eye protection.
5. Make all adjustments with the power off.
6. Be sure the leaf guards are operating properly and the blade will not extend beyond the table edge.
7. When cross cutting hold the material securely against the fence.
8. Always pull the blade through the work and return the cutter head behind the fence before removing material or starting the next cut.
9. Make sure the blade guard and kickback fingers are properly adjusted before ripping.
10. Always rip into the blade, never in the same direction as the rotation.
11. Make sure the blade has stopped before leaving the machine.



Name ____________________

Class ____________________

Date ______________ Grade __________

Safety Quiz

(Circle True or False)

1. Eye protection is not necessary except when ripping. T F

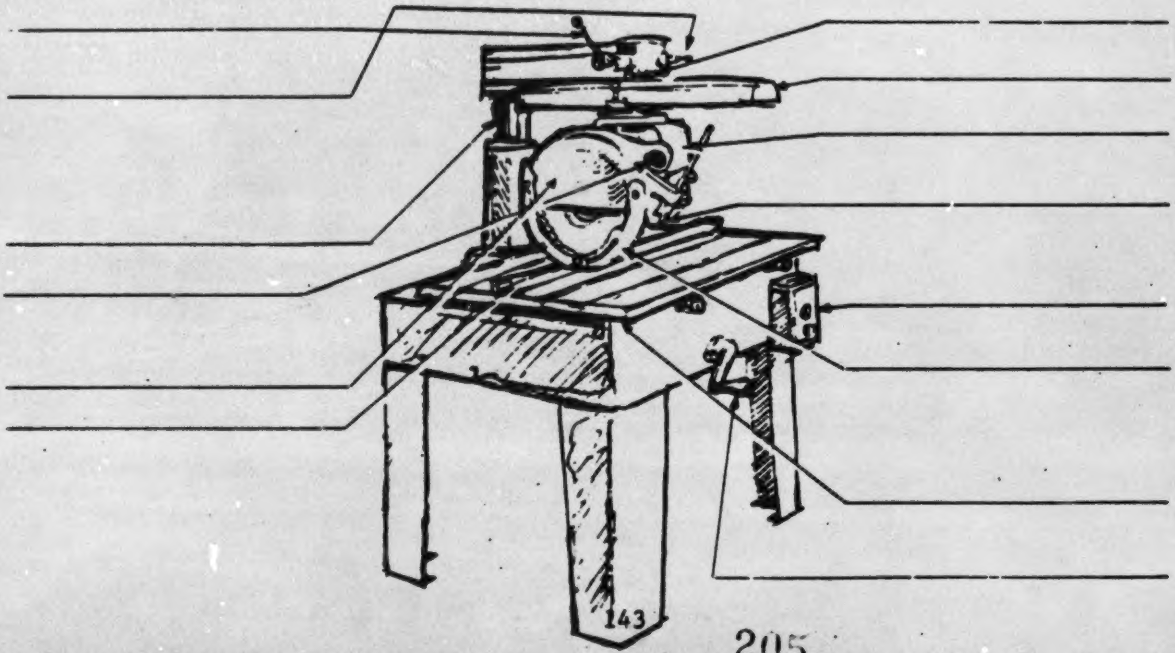
2. The guard and kickback fingers must be in place when ripping. T F

3. The saw blade may safely extend beyond the table. T F

4. The blade should be installed so that in cross cut position the teeth at the bottom of the blade point away from the operator. T F

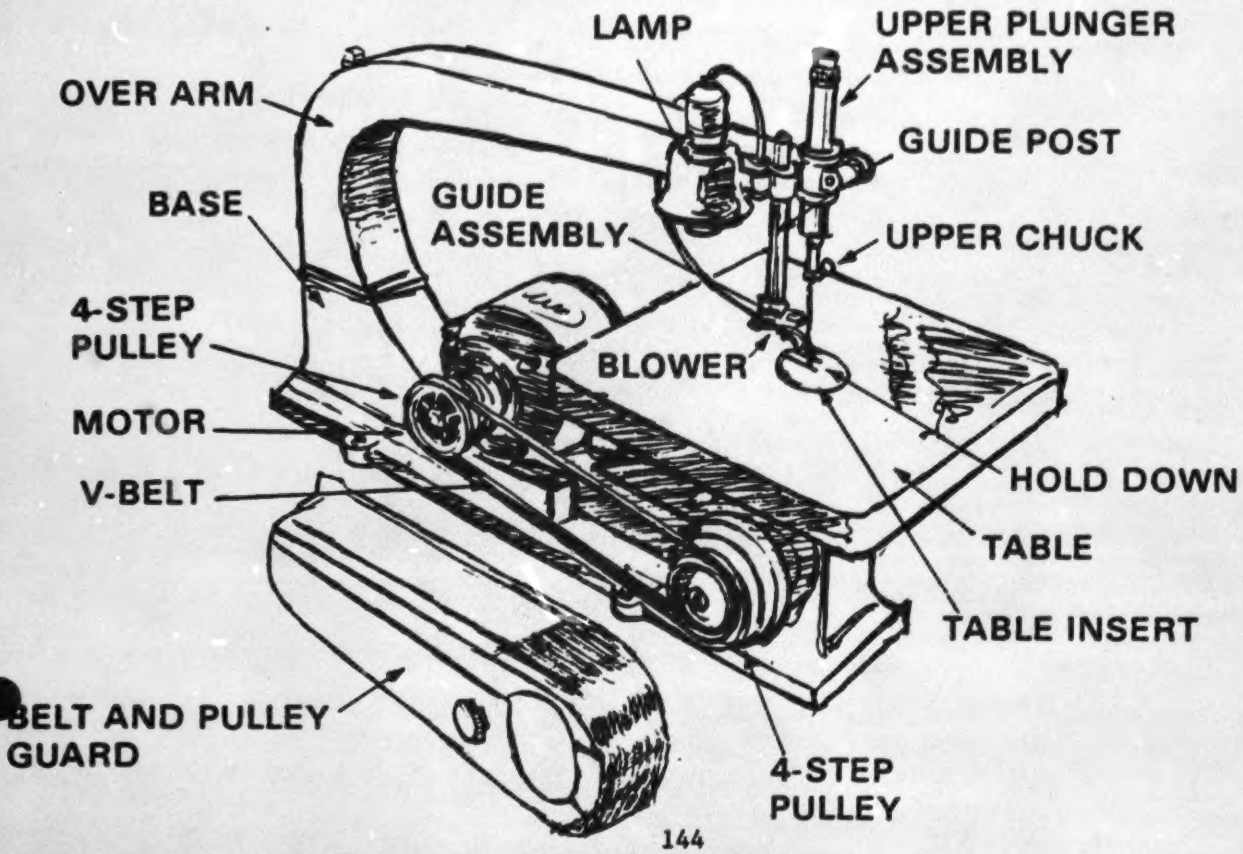
5. When ripping, one hand must hold the material and the other hand operate the saw. T F

6. In cross cutting, the saw should be returned to the rear of the arm upon the completion of each cut. T F



For Safety —

1. Operate only with instructor's permission and after you have received instruction.
2. Remove jewelry, eliminate loose clothing, and confine long hair.
3. Make sure all guards are in place and operating correctly.
4. Always use proper eye protection.
5. Make all adjustments with the power off, then rotate the motor by hand as a final check.
6. Be sure hold down is pressing lightly on the work piece.
7. The blade should be held firmly in the chucks, be square with the table, and be properly supported by the guide assembly.
8. Guide the material slowly through the machine with both hands, keeping fingers away from the cut line.
9. Choose the correct blade and correct speed for the material to be cut, and for the smallest radius required.



S

Scroll Saw

Name ____________________

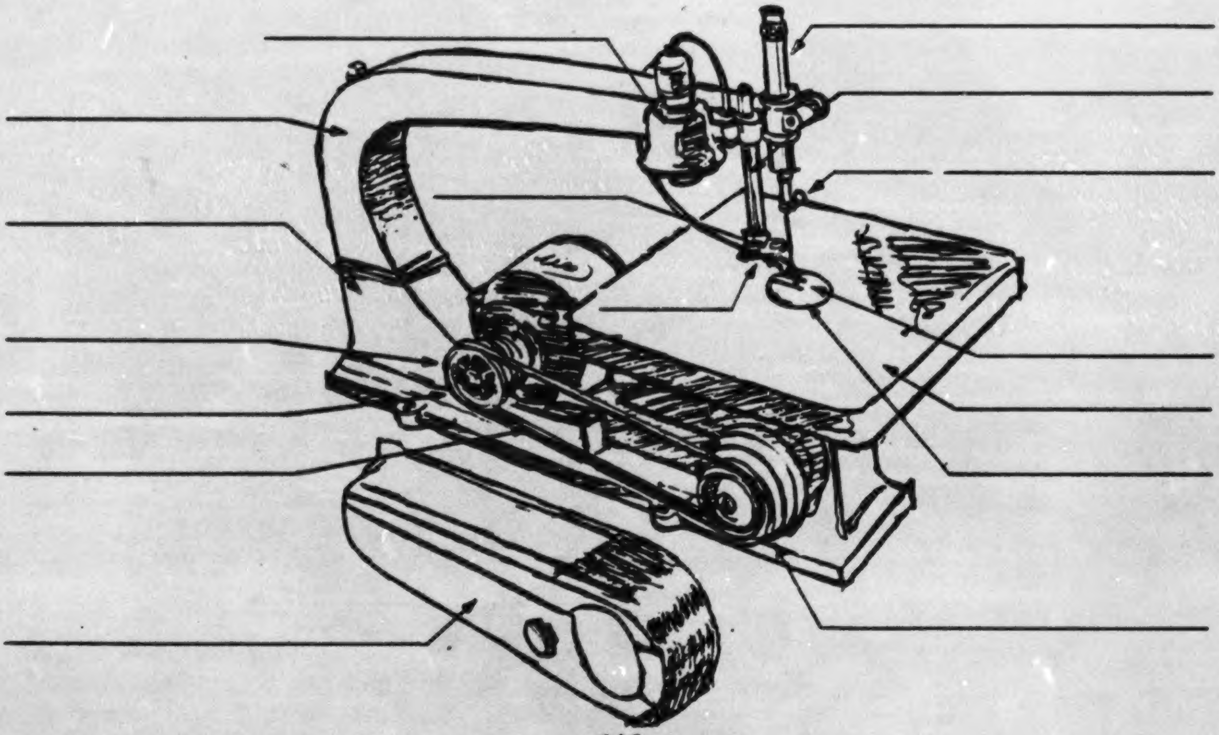
Class ____________________

Date ______________ Grade __________

Safety Quiz

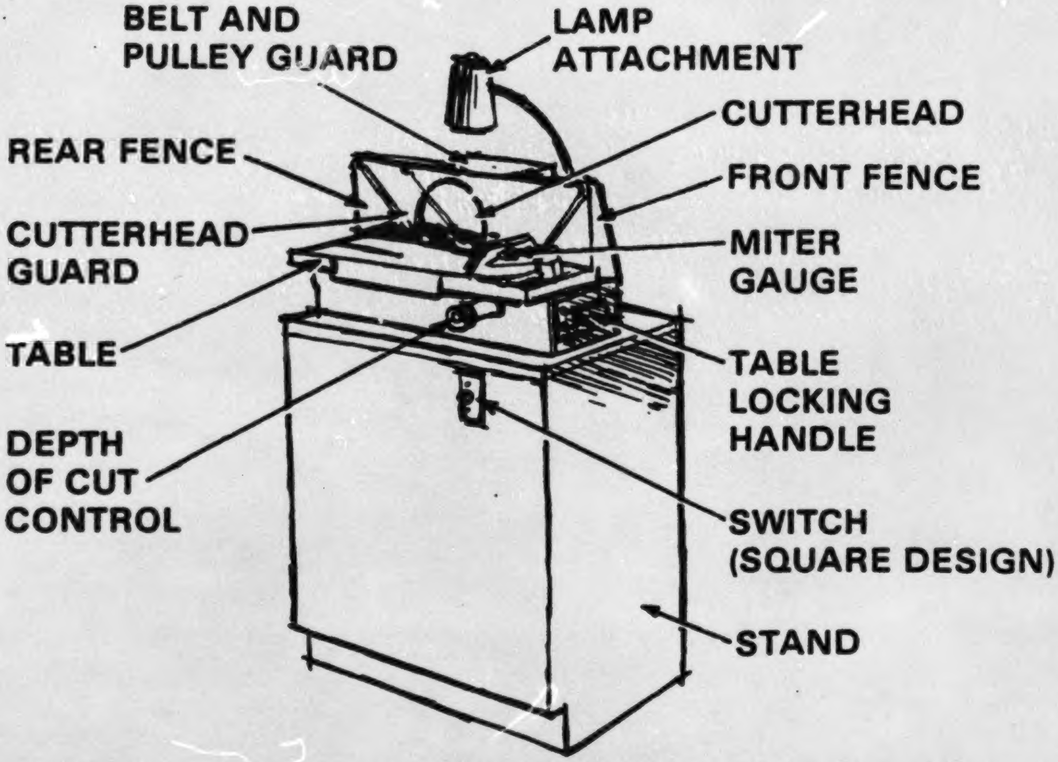
(Circle True or False)

1. If the blade pinches in the kerf you should just push harder. T F
2. It is necessary to have the flat side of the stock tight against the table. T F
3. Fingers should be kept away from the cutting line. T F
4. The hold down should be 1/16" from the work piece. T F
5. After changing blades or making guide adjustments the machine should be rotated one full stroke by hand. T F



For Safety —

1. **Operate only with instructor's permission and after you have received instruction.**
2. **Remove jewelry, eliminate loose clothing, and confine long hair.**
3. **Make sure all guards are in place and operating correctly.**
4. **Always use proper eye protection.**
5. Be sure switch is in off position before adjusting depth of cut, table tilt, or checking cutters.
6. The guard must be clean and slide freely before beginning the operation. Do not clamp in the up position.
7. Always use push stick or a push block when planing small material.
8. Continue moving the work piece past the cutterhead until it is resting against the rear fence.
9. Do not brush chips or dust away from the point of operation until the machine has come to a full stop.



Name ______________________________

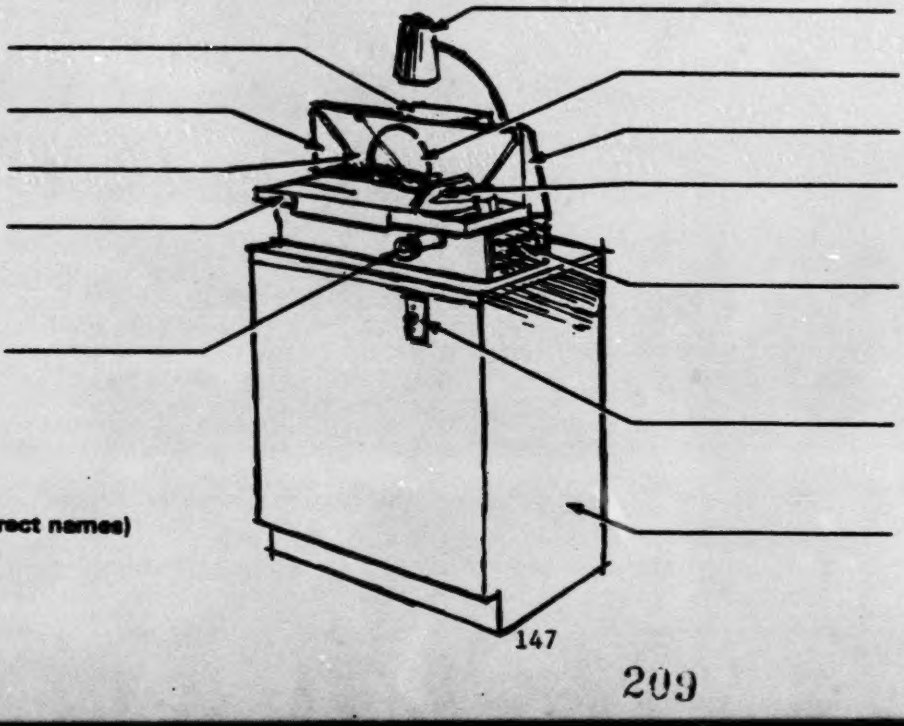
Class ______________________________

Date ________________ Grade __________

Safety Quiz

(Circle True or False)

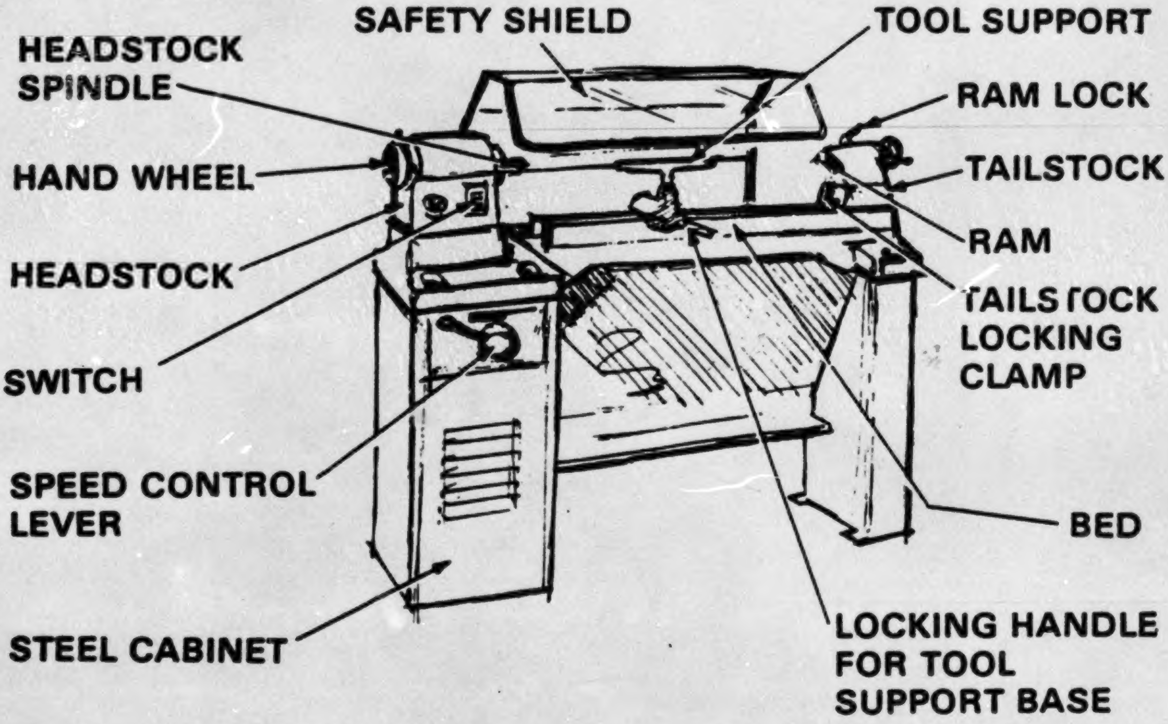
1. The guard should be clamped in position to clear the work piece. T F
2. Loose cutters will give a rough cut but are not detrimental to safety. T F
3. The work piece should be moved through the machine to the rear fence before removing. T F
4. The machine must come to a full stop before it is safe to leave the work area. T F
5. All adjustments should be made with the power off. T F
6. A lamp attachment contributes to safety. T F



(Print the correct names)

For Safety —

1. **Operate only with instructor's permission and after you have received instruction.**
2. **Remove jewelry, eliminate loose clothing, and confine long hair.**
3. **Make sure all guards are in place and operating correctly.**
4. **Always use proper eye protection.**
5. Work must be balanced and securely held between centers or mounted on a face plate.
6. Rotate spindle by hand to check clearance before starting the lathe.
7. Make sure safety shield is lowered.
8. Tool rest must be 1/8" from the work piece and adjusted to the proper height for the tool being used.
9. Be sure the lathe is running at the proper speed for the operation.
10. Remove the tool rest and base or support before sanding or polishing.
11. Make sure lathe cutting tools are sharp, and use the correct tool for the operation.



S

Wood Lathe

Name ______________________________

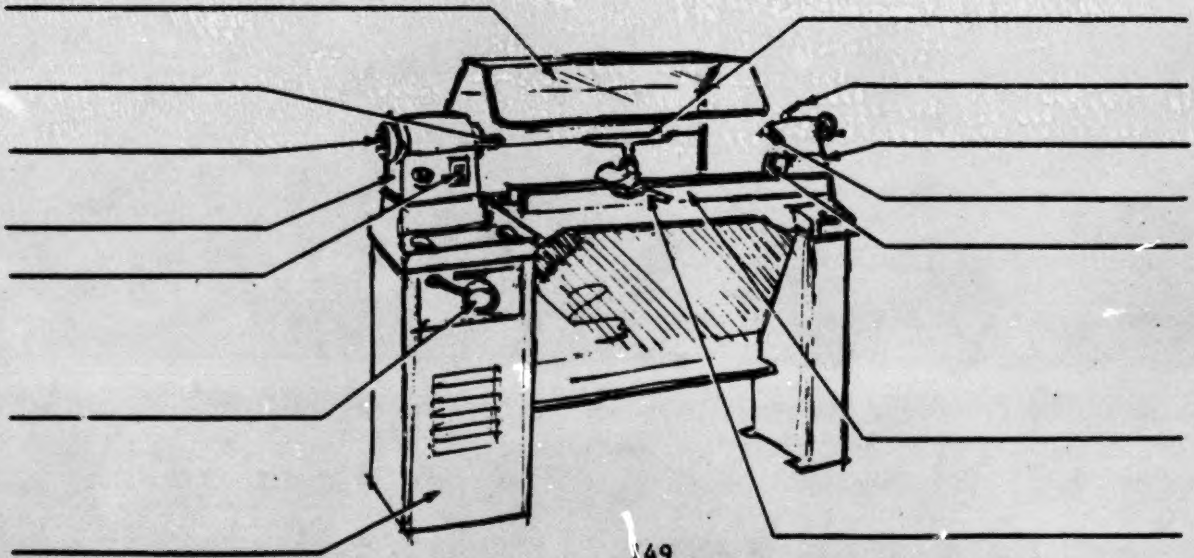
Class ______________________________

Date ________________ Grade __________

Safety Quiz

(Circle True or False)

1. The speed of the machine is not important for safe operation. T F
2. A space of 1" is safe between the tool rest and the work. T F
3. Eye protection is not necessary during operation. T F
4. Dull tools may be used for a roughing operation. T F
5. The tool rest should be removed while sanding. T F
6. It is safe to turn work that is not balanced. T F
7. Long sleeves may be worn while operating the lathe. T F
8. The cutting tools should be held loosely. T F

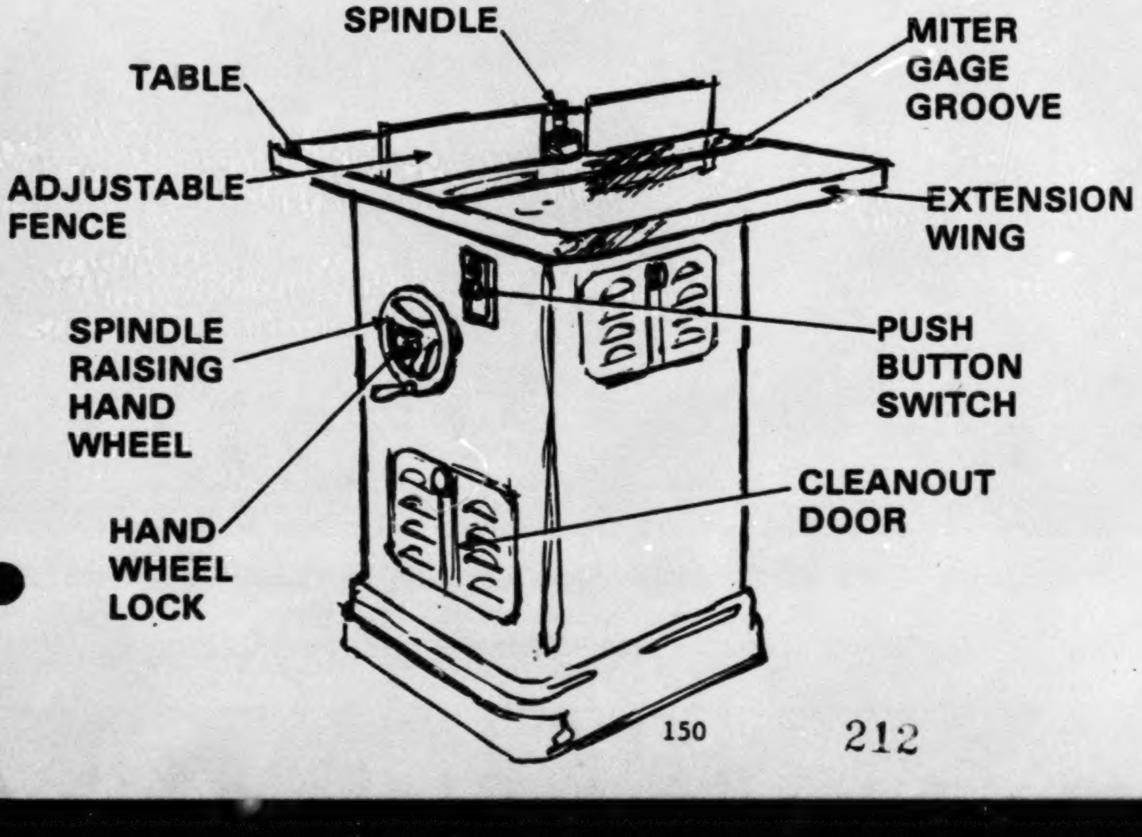


(Print the correct names)

Wood Shaper

For Safety —

1. **Operate only with instructor's permission and after you have received instruction.**
2. **Remove jewelry, eliminate loose clothing, and confine long hair.**
3. **Make sure all guards are in place and operating correctly.**
4. **Always use proper eye protection.**
5. All adjustments for cutter heighth and fence position should be made with the power off.
6. Guards and hold downs should be checked for proper operation.
7. Choose the correct cutter and collars for the operation.
8. Expose only the amount of cutter necessary to do the job. Use additional fixtures if necessary.
9. Always use a starting pin for free hand shaping .
10. Use the smallest table insert possible.
11. Use three wing-one piece cutters whenever possible.
12. Brush away dust and chips only when the machine is stopped.



Name ______________________________

Class ______________________________

Date ________________ Grade __________

Safety Quiz

(Circle True or False)

1. In most cases guards and hold downs only get in the way. T F

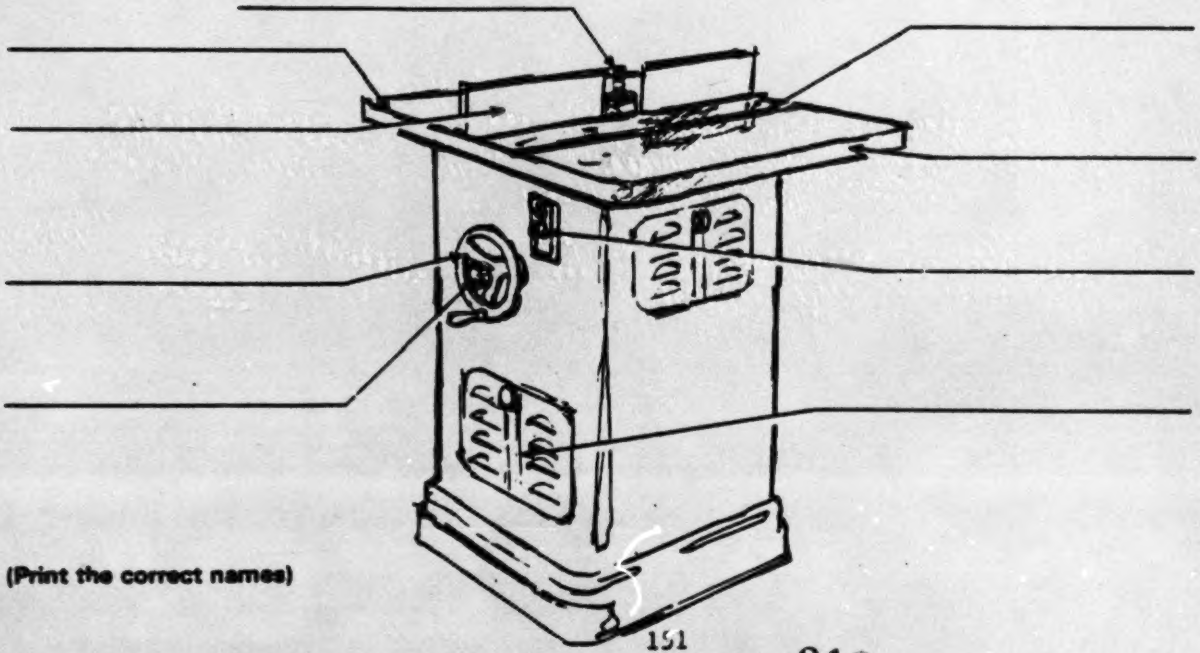
2. Often special or custom fixtures must be made to do a job safely. T F

3. A starting pin is not necessary. T F

4. The largest table insert should always be used. T F

5. A brush should be used to brush away chips when the machine is running. T F

6. Three wing cutters are safer than a cutter head. T F



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SAFETY RULES FOR PORTABLE ELECTRIC HAND TOOLS

1. The instructor's permission must be obtained before using portable electric tools.

2. Be sure that the switch is in the "off" position before you plug in the electric cord.

3. Wear eye protection when operating all portable electric tools.

4. Be sure that the switch on each equipment handle is the constant pressure (dead-man) type. That is, when pressure is released, power is shut off.

5. Be sure that equipment is properly grounded; do not use in wet areas.

6. Do not wear loose or baggy clothing that could be caught in revolving parts.

7. Before starting, be sure that you have a good footing and that your work area is free of obstacles.

8. Inspect the electric cord for breaks or exposed wires before using.

9. Do not use excessive pressure while operating portable electric tools as this may damage the tools and cause accidents.

10. Properly secure all work before applying the tool.

11. Inspect guards before starting to see that they function properly.

12. When portable electric saws are used, take care to avoid cutting through the power supply and extension cords.

13. When portable electric saws are used, avoid "over-reaching" when completing a cut. Work should be positioned and secured in a manner that allows the tool operator to "walk through" the cut safely.

14. Be sure that stock is positioned and secured in a manner that allows cutting without binding of the saw blade of portable circular and bayonet-type saws.

15. Disconnect the cord plug from the power outlet before making any adjustments or replacing a blade or cutter.

16. If an extension cord must be used, make sure it is 12 gauge wire or heavier for lengths up to 100 feet, and 10 gauge or heavier for lengths up to 150 feet.

S

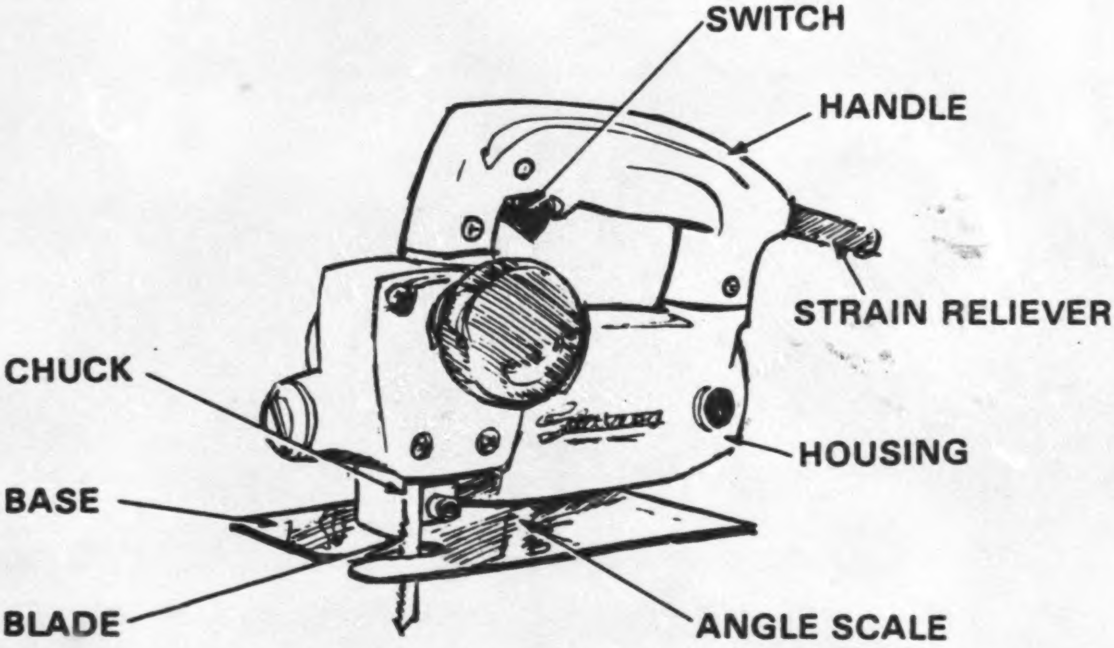
17. Never run a portable electric tool where there is danger of explosion or fire due to the presence of naptha, gasoline, benzene or other inflammable substance.

18. Keep your fingers away from blades or cutters.

Bayonet Saw

For Safety —

1. **Operate only with instructor's permission and after you have received instruction.**
2. **Remove jewelry, eliminate loose clothing, and confine long hair.**
3. **Make sure all guards are in place and operating correctly.**
4. **Always use proper eye protection.**
5. Make sure the blade is the correct type for the material and that it is tightly clamped in the chuck.
6. Be sure the switch is off before connecting to the power source.
7. Use vise or clamps to hold material to be cut securely.
8. Keep cutting pressure constant; do not force the blade into the work.
9. Always keep the base tightly against the material being cut.
10. Do not set the saw down on the bench until it has stopped.
11. If the blade is in the tool be sure and lay the tool on its side.



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Bayonet Saw

Name ______________________

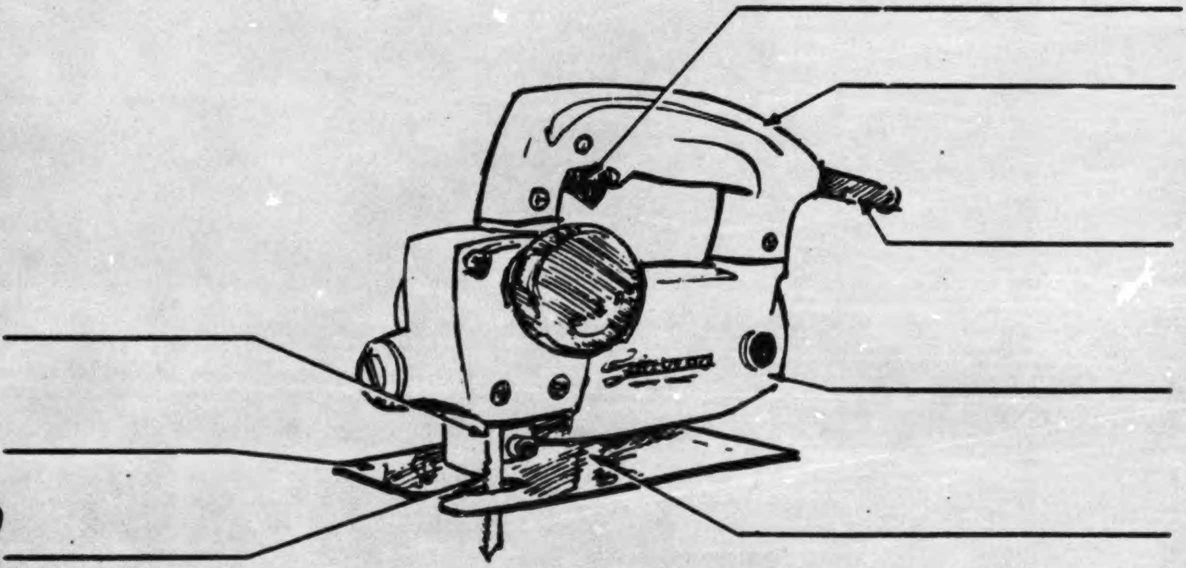
Class ______________________

Date ______________ Grade __________

Safety Quiz

(Circle True or False)

1. Any blade will safely cut any kind of material. T F
2. Material should be held securily before starting to cut. T F
3. Cutting pressure should be constant without forcing the blade into the work. T F
4. The base should always be flat against the work, even when the saw is tilted. T F
5. The saw can be stored using the blade and the rear of the base for support. T F
6. The housing and handle should be kept free of grease, chips, and dust. T F



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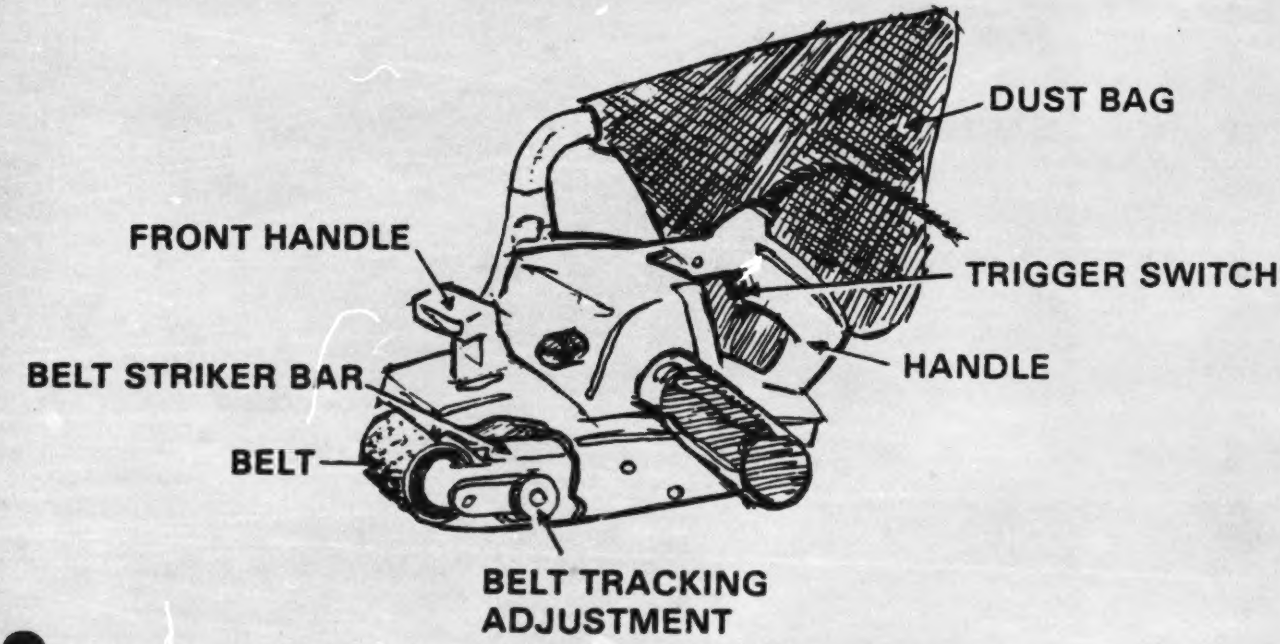
Portable Belt Sander

For Safety —

1. **Operate only with instructor's permission and after you have received instruction.**
2. **Remove jewelry, eliminate loose clothing, and confine long hair.**
3. **Make sure all guards are in place and operating correctly.**
4. **Always use proper eye protection.**
5. Check to see if belt is in good condition, tracking properly, and is the correct grit size for the job.
6. Be sure switch is off before connecting to power source.
7. Start sander above work; let rear of belt touch first then level the tool. Do not tilt sideways.
8. Sand in direction of grain moving back and forth over a large area. Do not pause in one spot.
9. Keep electrical cord and dust bag away from working area.
10. Lift sander off the work and wait until it has stopped before placing on the bench.



Portable Belt Sander

Name ______________________________

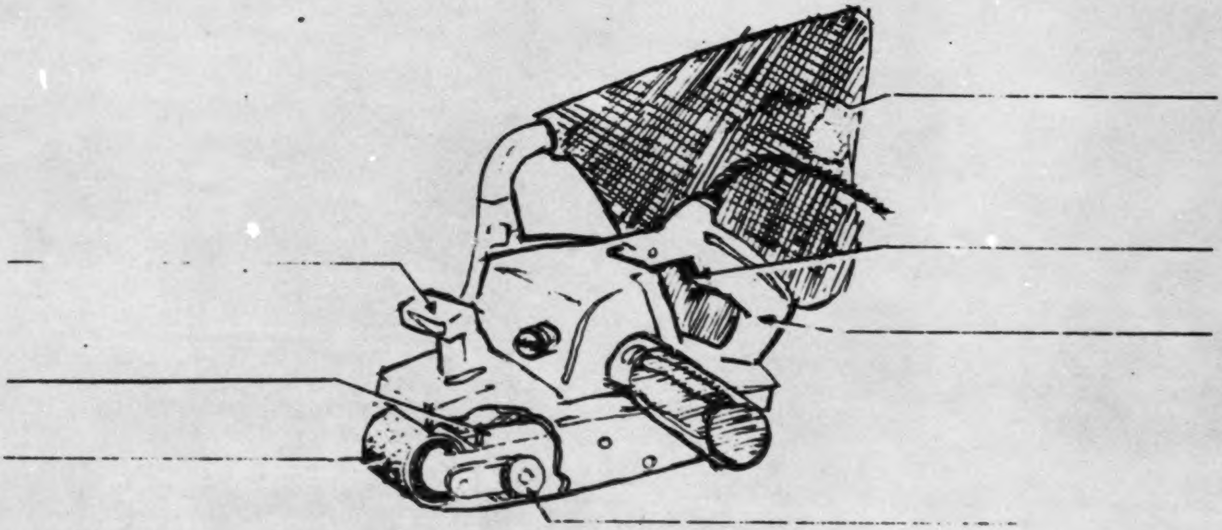
Class ______________________________

Date ________________ Grade __________

Safety Quiz

(Circle True or

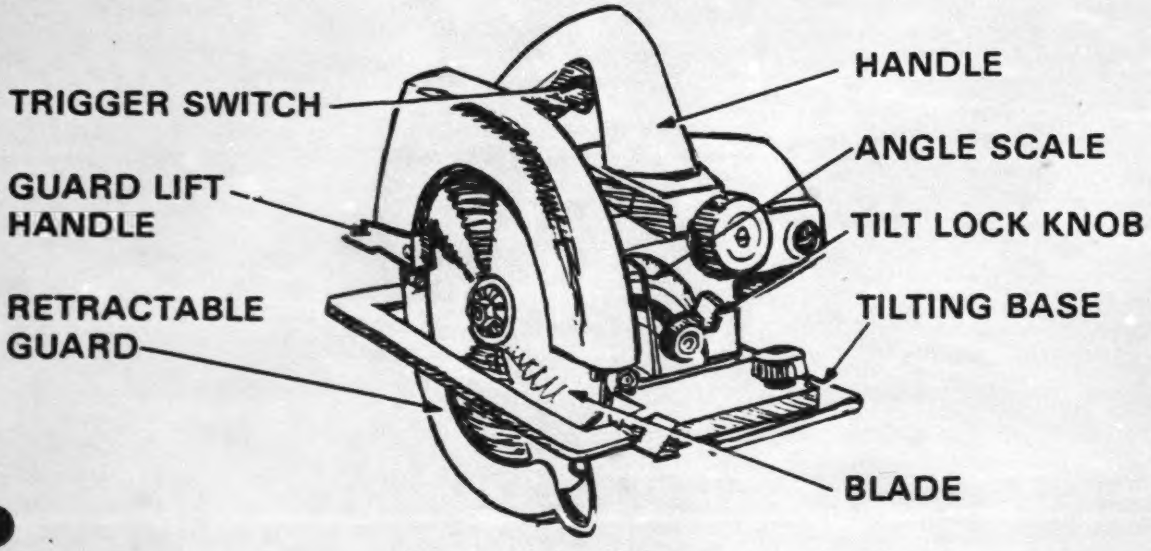
1. Proper belt is not a real factor in safe operation. T F
2. The sander should be resting flat on the work piece when starting. T F
3. If a firm grip is maintained on both handles it is not critical to remove jewelry. T F
4. There is a relation between selecting the correct belt for the job and safety. T F
5. The tool should never be tilted or allowed to pause in one spot. T F



Portable Electric Circular Saw

For Safety —

1. **Operate only with instructor's permission and after you have received instruction.**
2. **Remove jewelry, eliminate loose clothing, and confine long hair.**
3. **Make sure all guards are in place and operating correctly.**
4. **Always use proper eye protection.**
5. Make sure that telescoping guard returns automatically to cover the blade after each cut.
6. Check the base setting for the proper depth of cut.
7. Make sure the power cord is clear of the blade.
8. Be sure the material you are cutting is adequately supported.
9. Do not start the cut until the saw has reached full speed.
10. Advance the saw slowly, straignt through the work. Do not twist or turn the tool.
11. If the saw blade binds or smokes, stop cutting immediately.
12. The blade should be extended below the work until the blade gullets clear the material.
13. Do not set saw down until blade stops.



S

Portable Electric Circular Saw

Name ______________________________

Class ______________________________

Date ____________________ Grade __________

Safety Quiz

(Circle True or False)

1. Permission should be obtained before operating this machine. T F

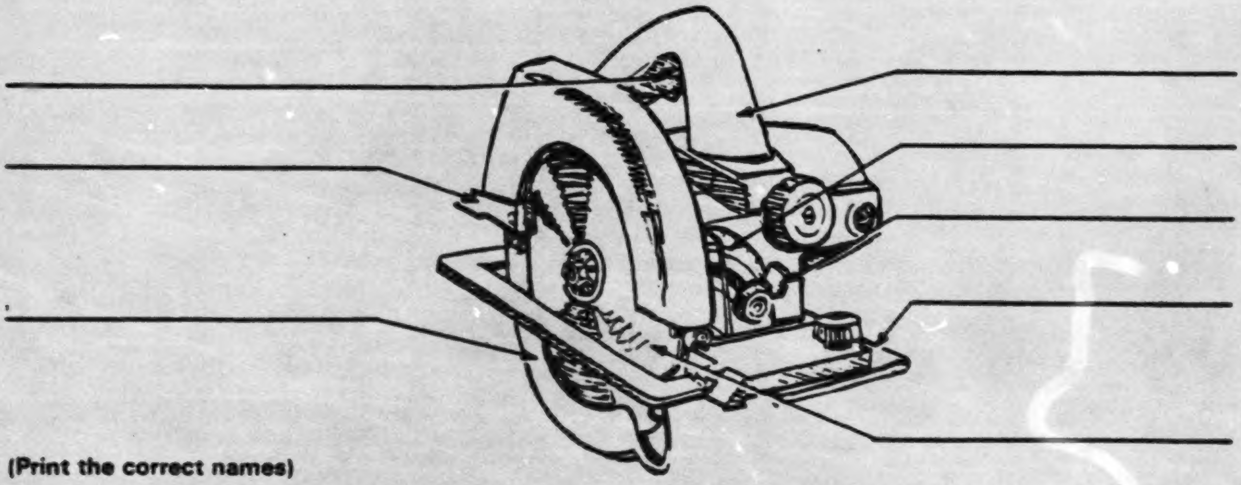
2. In certain cases the guard should be wedged so that it will not be operable. T F

3. Eye protection is not necessary when using this machine. T F

4. You should not set the saw down until it has completely stopped. T F

5. The saw blade should extend at least 1" beyond the thickness of the material being cut. T F

6. This saw can safely be used for cutting curves. T F



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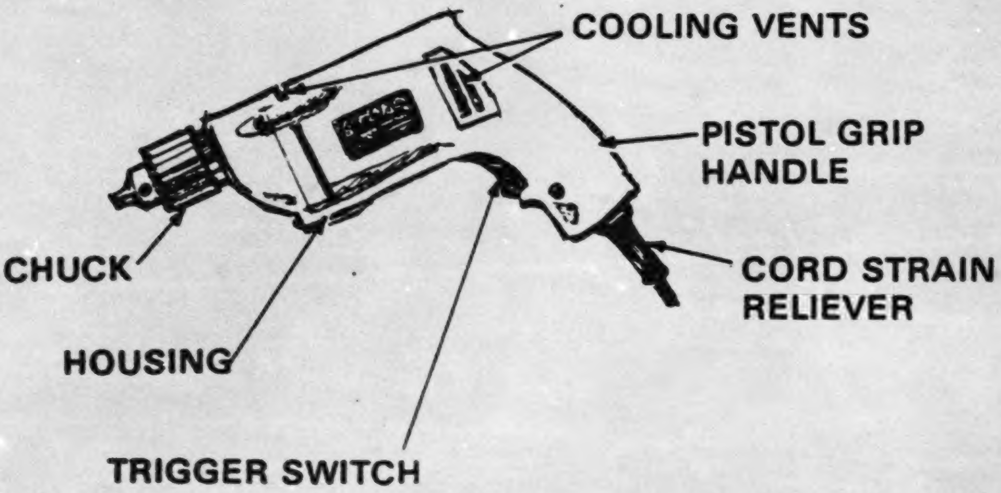
Portable Electric Drill

For Safety —

1. **Operate only with instructor's permission and after you have received instruction.**
2. **Remove jewelry, eliminate loose clothing, and confine long hair.**
3. **Make sure all guards are in place and operating correctly.**
4. **Always use proper eye protection.**
5. "Unplug" the drill when changing bits.
6. Make sure switch is off and key removed before connecting to power source.
7. Mark hole location with center punch (metal) or AWL (wood) before drilling.
8. Be sure work is tightly clamped or secure before drilling.
9. Drill with straight even steady pressure.



Name ______________________

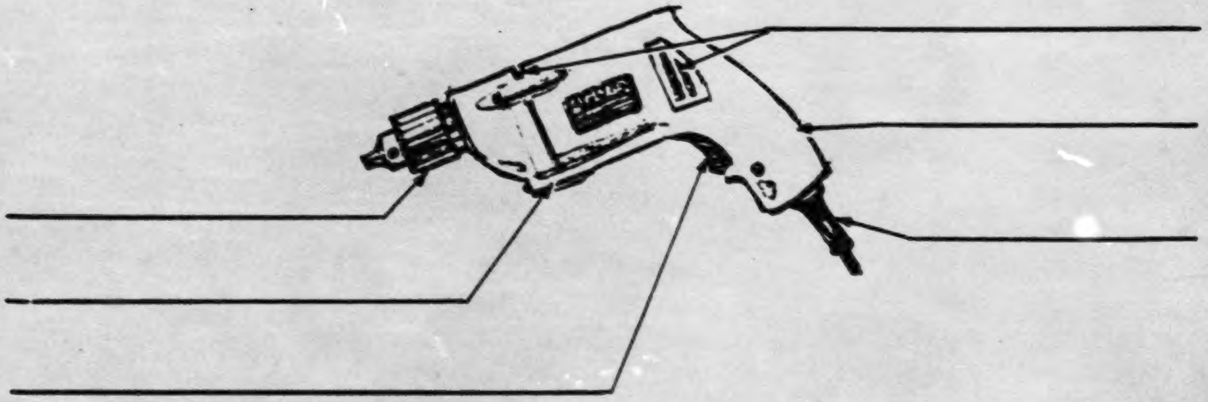
Class ______________________

Date ______________ Grade ________

Safety Quiz

(Circle True or False)

1. Eye protection is not really necessary when drilling wood. T F
2. The drill should be unplugged when changing bits. T F
3. It is allright to carry the drill by the cord. T F
4. Even steady pressure should be used when drilling. T F
5. Work should be clamped while drilling. T F



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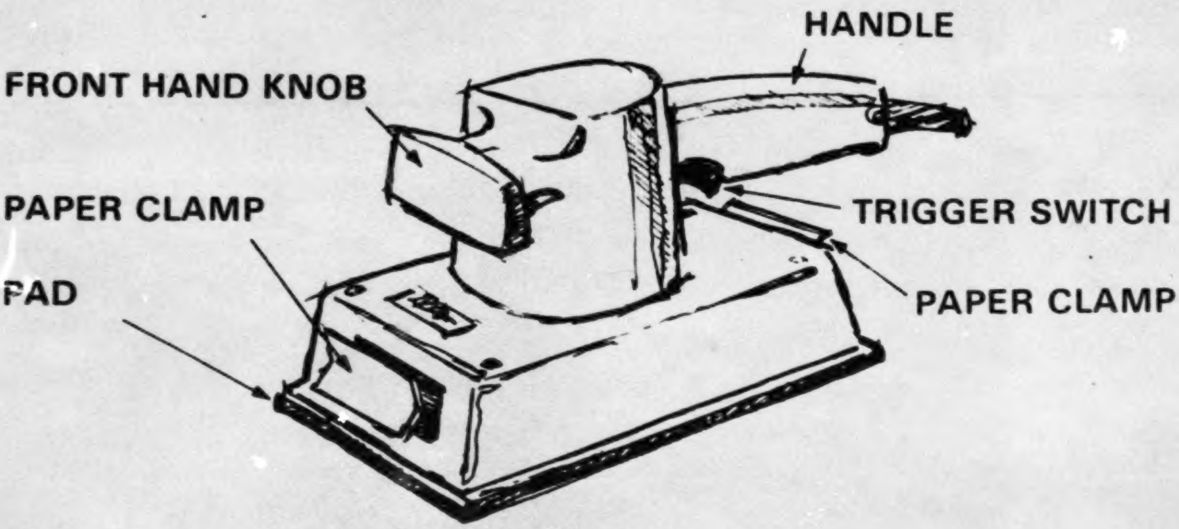
Portable Electric Finishing Sander

For Safety —

1. **Operate only with instructor's permission and after you have received instruction.**
2. **Remove jewelry, eliminate loose clothing, and confine long hair.**
3. **Make sure all guards are in place and operating correctly.**
4. **Always use proper eye protection.**
5. Be sure switch is in off position before connecting to the power source.
6. Make sure abrasive sheet is in good condition and properly installed on the tool.
7. Start the tool above the work, set it down evenly, and move slowly over a wide pattern area.
8. Lift the sander from the work before stopping the motor.
9. Do not set the sander on the work bench until it has stopped running.
10. Never lift or carry any portable electric tool by the power cord.



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Portable Electric Finishing Sander

Name ______________________________

Class ______________________________

Date ________________ Grade ________

Safety Quiz

(Circle True or False)

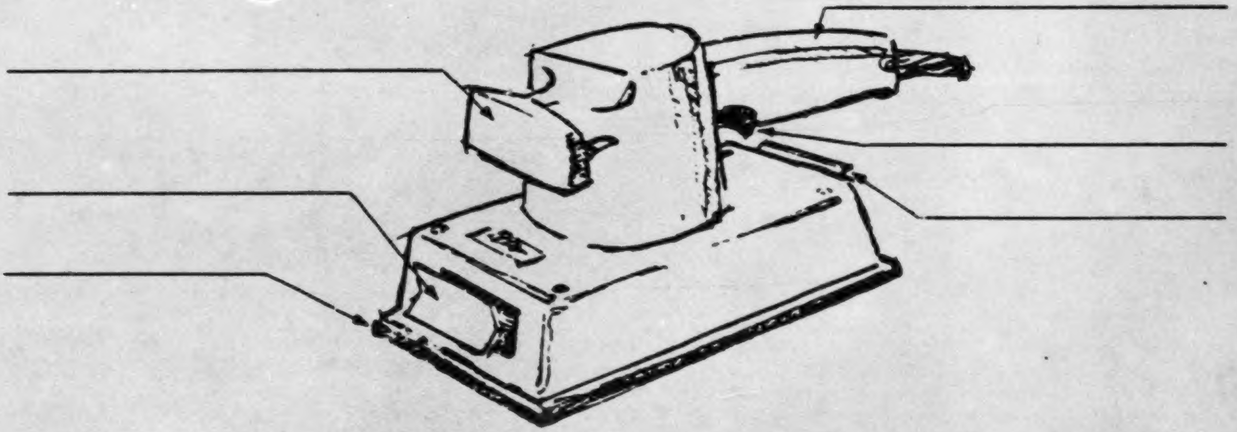
1. Eye protection must be worn when using the sander. T F

2. The abrasive sheet can be loosely clamped yet still be be safe and efficient. T F

3. The sander should never be carried by the power cord. T F

4. The tool should be turned on only after it is placed tightly on the material to be sanded. T F

5. Lift the sander from the work before turning it off. T F



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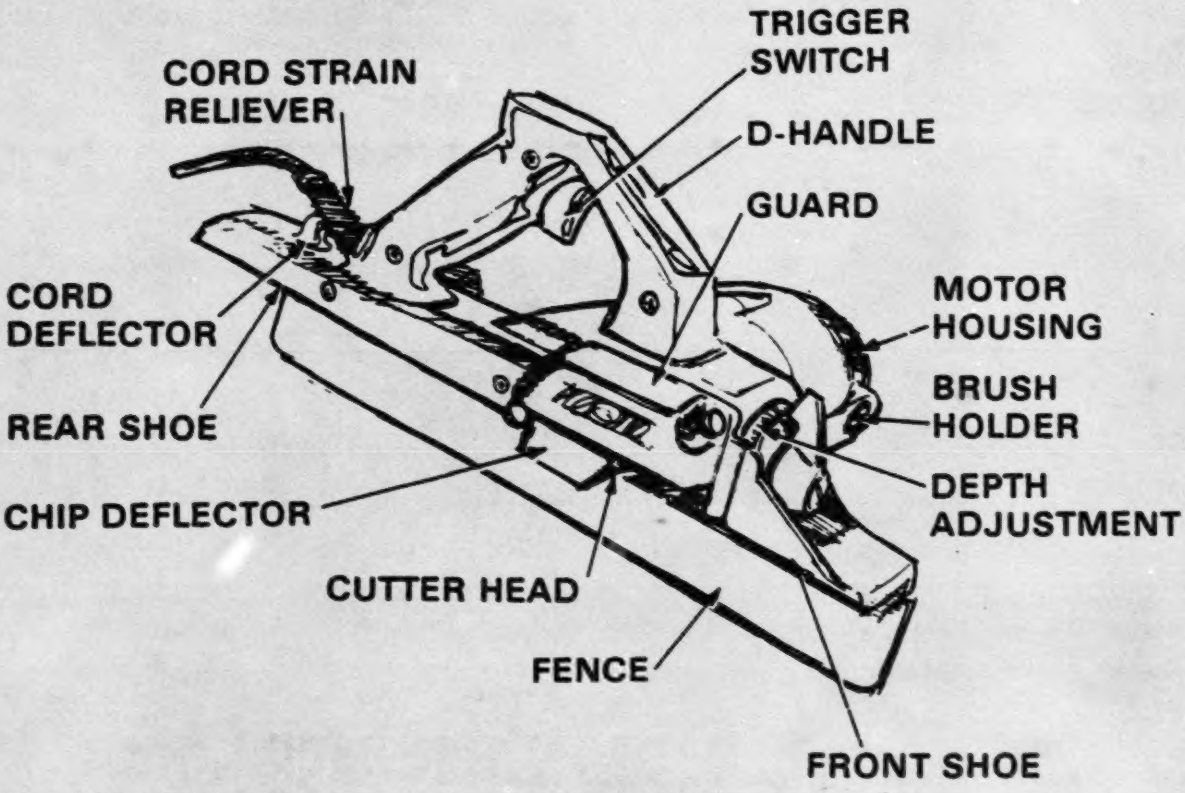
For Safety —

1. **Operate only with instructor's permission and after you have received instruction.**
2. **Remove jewelry, eliminate loose clothing, and confine long hair.**
3. **Make sure all guards are in place and operating correctly.**
4. **Always use proper eye protection.**
5. Before connecting to the power source, make sure the switch is in the off position.
6. Make all adjustments with the plane disconnected from the power source.
7. Place front shoe on the work piece, start motor, then more plane over work keeping pressure and speed constant.
8. Keep fence and the rear shoe tightly against the work piece until the cutter has cleared the work.
9. Keep hands on handle and motor housing, away from the cutter head.
10. Be sure of clearance for the motor.



S

Portable Electric Plane

Name ______________________________

Class ______________________________

Date ________________ Grade ________

Safety Quiz

(Circle True or False)

1. Since the cutter will not touch, it is allright to set the plane on the bench while still running. T F

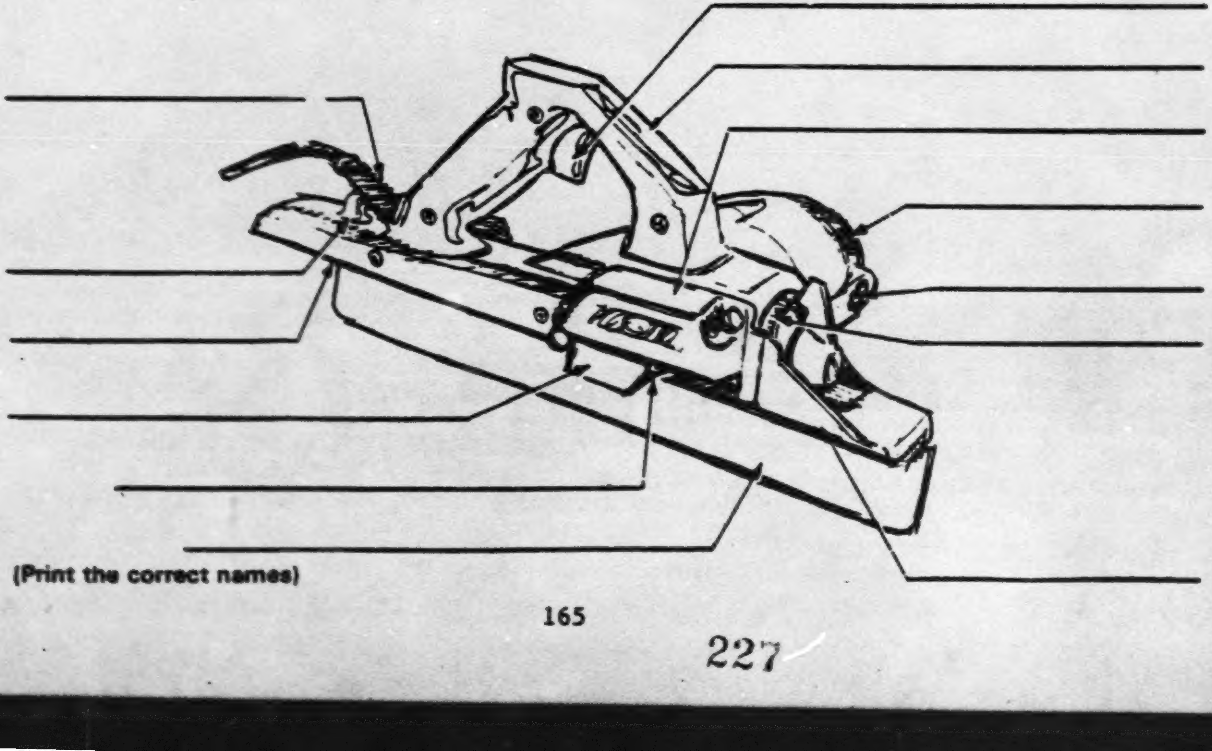
2. The plane will cut deeper when more pressure is applied. T F

3. The plane should be disconnected before adjusting the depth of cut or the fence. T F

4. Eye protection is required when using a power plane. T F

5. The plane should be kept firmly against the work piece until the cut is completed. T F

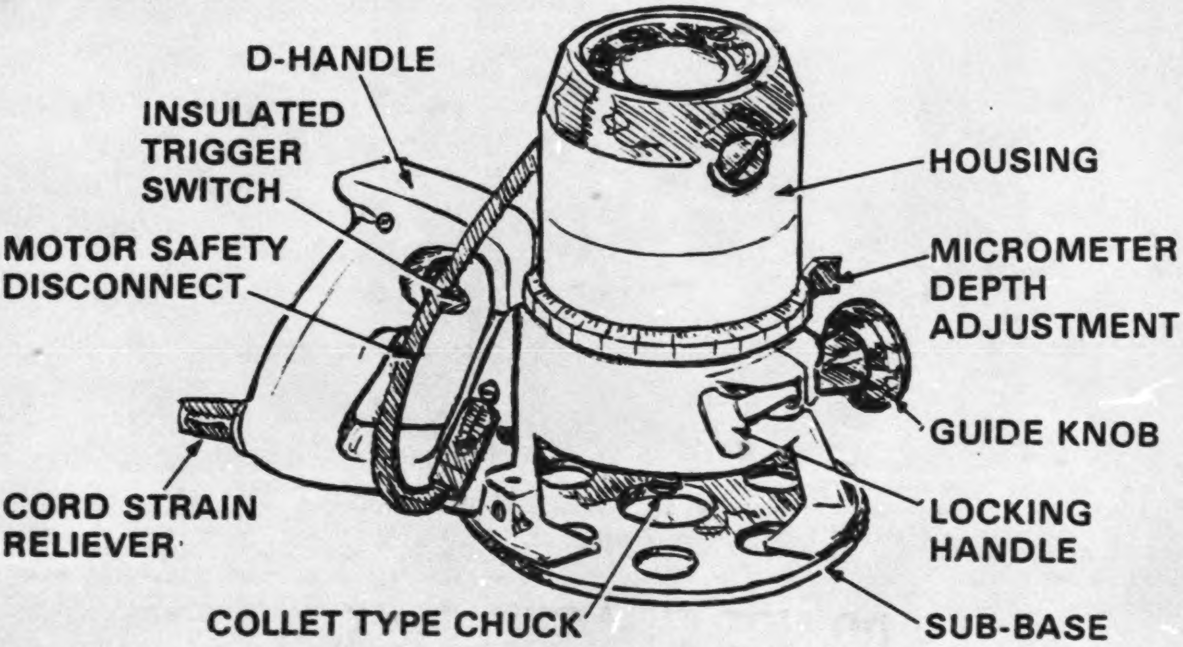
6. The chip deflector is of no real safety value and can be removed. T F



(Print the correct names)

For Safety —

1. **Operate only with instructor's permission and after you have received instruction.**
2. **Remove jewelry, eliminate loose clothing, and confine long hair.**
3. **Make sure all guards are in place and operating correctly.**
4. **Always use proper eye protection.**
5. Be sure switch is off before inserting plug into power source.
6. Be sure collet chuck is tight and bit is secure.
7. Make sure work piece is clamped or rigidly held and the area of router travel is free of obstructions.
8. Hold router with both hands and keep cutting pressure constant. Do not force or jam into work.
9. Make a trial cut in a piece of similar scrap material.
10. Disconnect from power source when changing bits, making adjustments, or when router is not in use.



Portable Electric Router

Name ____________________

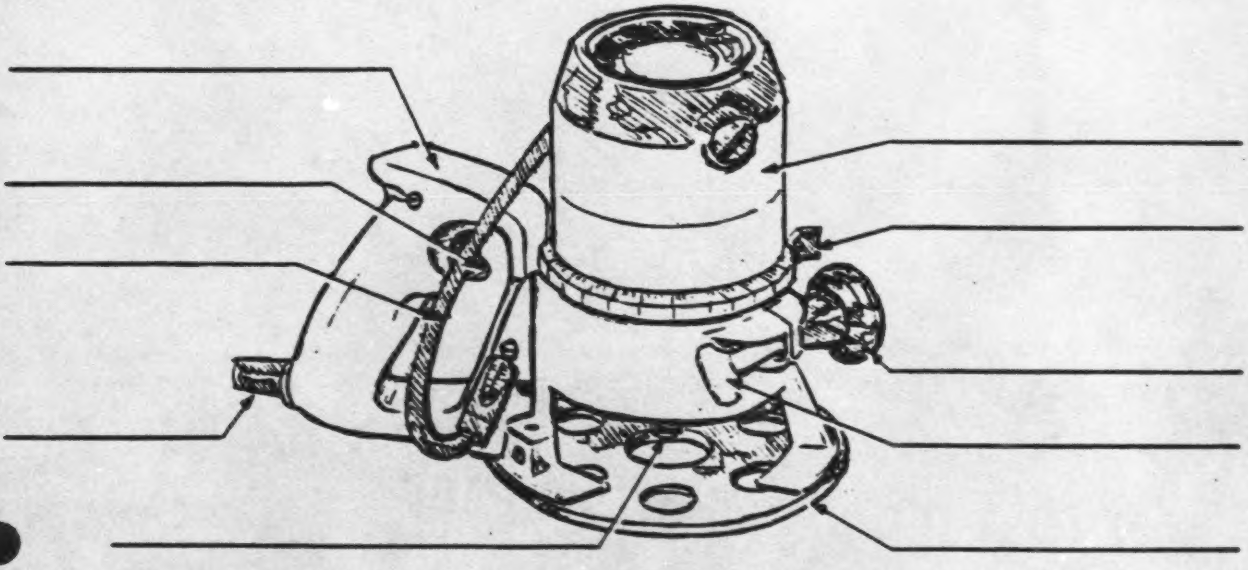
Class ____________________

Date ____________ Grade ________

Safety Quiz

(Circle True or False)

1. It is a good idea to make a trial cut in a piece of scrap wood. T F
2. A router should always be held with both hands. T F
3. A jogging motion should be used when cutting to keep the bit cool. T F
4. It is not necessary to clamp material being routed. T F
5. The depth of cut may be safely adjusted without unplugging the tool. T F
6. The router is not really guarded. T F



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APPENDIX C

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C. Stanley Tool Guide, Stanley Tools, Division of the Stanley Works, New Britian, Connecticut, 1968.